THE COMPUTING MACHINERY FIELD

Vol. 2, No. 1 JANUARY, 1953

Published six times a year (January, March, May, July, September, and November) by Edmund C. Berkeley and Associates, 36 West 11 St., New York 11, N.Y.

THE EDITOR'S OFFICE

Six Times a Year. With this issue (the fifth one), THE COMPUTING MACHINERY FIELD becomes a bimonthly instead of a quarterly, without increase of subscription rate. The number of subscriptions is rising rapidly. Advertising is apparently steady. There is no question about the amount of useful information that can be published in the computing machinery field; and it is a pity to delay information any longer than can be helped.

Who's Who. As we said in a post card mailed Dec. 1 to about 2500 persons, "We are now hoping to publish a Who's Who (in sections) of individuals in the field, so that we can make it easier for all people interested in computing machinery to get in touch with each other in appropriate ways".

As of Dec. 31, we had received to our surprise and satisfaction over 950 responses, brief factual information about that many persons. Our thanks to you all. The first section of the Who's Who is published in this issue. We ask you please to continue to send in Who's Who information to be used in later issues of THE CMF, and to ask your colleagues to do so.

The Grapevine. The computing machinery field is notorious for a robust grapevine of news and rumor. We have wondered about putting a department into this magazine -- since it is both yours and ours -- reporting "The Grapevine". Please write us whether you think this is a good idea or not.

Roster of Computers. For lack of space, we have had to put off until the March issue the planned roster of automatic computers.

Advertising. Starting with the March issue we plan to print not only display advertising but also classified advertising, especially advertising about help wanted and positions wanted. If you are interested, see details on page 39.

FROM THE OCTOBER, 1952, ISSUE

Our purpose is to help provide information in the field of computing machinery, avoiding overlapping with other publications in this field. ... We hope particularly to gather and publish information which is factual, useful, and understandabl
We do not plan to be restricted to any subdivision or area of the field of machiner
for handling information. We shall be glad to consider articles for publication, especially if they are short and deal with important subjects. Besides the Roster of Organizations, there are doubtless other kinds of systematic reporting and exchange of information which can be useful and which we can try to carry out. ... We shall be grateful to anyone who sends us information, suggestions, comments or corrections.

NOTES

Back Copies. For information about back copies, see the note on page 7.

Manuscripts. For information about manuscripts wanted and rates, see the note on page 28.

Vol. 2, No. 1 Contents for January, 1953

THE COMPUTING MACHINERY FIELD, beginning Jan. 1, 1953, is published six times a year, in January, March, May, July, September and November, by Edmund C. Berkeley and Associates, 36 West 11 St., New York 11, N.Y. Prior to Jan. 1, 1953, it was a quarterly.

Subscription $3.50 for one year, $6.50 for two years in the United States and Canada; $4.50 for one year, $8.50 for two years, elsewhere. If your address changes, please notify us giving both old and new address, and allow three weeks for the change.

ROSTER OF ORGANIZATIONS IN THE FIELD OF COMPUTING MACHINERY

(Edition 5, supplement, information as of January 3, 1953)

The purpose of this Roster is to report organizations (all that are known to us) making or developing computing machinery, or components, or data-handling equipmen or automatic control equipment. Each Roster entry when it becomes complete contains: name of the organization, its address, nature of its interest in the field, kinds of activity it engages in, main products in the field, approximate number of employees, year established, and a few comments and news items. When we do not have complete information, we put down what we have. The term "components" as used here does not include nuts, bolts, resistors, condensers, motors, tubes, mercury, etc., but does include magnetic drums, cores, tapes, and certain other components that have an intimate and significant connection with computing machinery or automatic control equipment.

We seek to make this Roster as useful and informative as possible, and plan to keep it up to date every two months. We shall be most grateful for any more information, or additions or corrections that any reader is able to send us.

Although we have tried to make the Roster complete and accurate, we assume no liab lity for any statements expressed or implied.

This edition contains only revisions or additions as compared with Edition 4, cumu- lative, published in the October, 1952, issue of THE COMPUTING MACHINERY FIELD, vol. 1, no. 4.

Abbreviations

The key to the abbreviations follows:

Size

- Ls Large size, over 500 employees
- Ms Medium size, 50 to 500 employees
- Ss Small size, under 50 employees
  (No. in parentheses is approx. no. of employees)

Interests in Computing Machinery

- Dc Digital computing machinery
- Ac Analog computing machinery
- Sc Servomechanisms
- Ic Incidental interests in computin machinery
- Cc Automatic control machinery

When Established

- Se Organization established a short time ago (1942 or later)
- Me Organization established a "medium" time ago (1923 to 1941)
- Le Long established organization (1922 or earlier)
  (No. in parentheses is year of establishment)

Activities

- Ma Manufacturing activity
- Sa Selling activity
- Ra Research and development
- Ca Consulting
- Ga Government activity
- Pa Problem-solving activity
- Ba Buying activity
  (used also in combinations, a in RMSa, "research, manufactu ing and selling activity".)

*C This organization has very kindly furnished us with information expressl for the purpose of the Roster, and therefore our report is likely to be more complete and accurate than otherwise might be the case. (C for Checking)

*A This organization has placed an advertisement in this issue of THE COMPUTING MACHINERY FIELD. For more information, see their advertisement. (A for Advertisement)

ROSTER

Ampex Electric Corp., Redwood City, Calif. *C
Magnetic recording of data. Ic RMSa Ms (375) Se (1944)

Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill. *C
Use analog computers; manufacture servomechanisms and automatic controls. Ms (400) Me (1930) SCc RMSPa

Avoin Instrument Corp., Paramus, N.J. *C
Digital and analog computing machinery. Magnetic recorders, amplifiers, precision wire-wound potentiometers. Ms (175) Se (1946) RMSa DAIc

Baird Associates, 33 University Road, Cambridge 38, Mass. *C
Spectroscopic analysis equipment. Scientific instruments. Analog devices and servomechanisms. Instrumentation for industrial control. Research in physical optics. Ms (170) Me (1936) AISc RMSa

Bendix Aviation Corp., Pacific Division, North Hollywood, Calif. *C
Telemetering systems. Digital, controls and components. Ms (50) Se (1952) Ic RMSa

Edmund C. Berkeley and Associates, 36 West 11 St., New York 11, N.Y., and 19 Milk St., Boston 9, Mass. *C
Small one-of-a-kind computers (Simon) and robots (Squee). Others under development. Courses, publications. The Computing Machinery Field. Ss (9) Se (1948) Dc RCMSa *A

Bryant Chucking Grinder, Springfield, Vt.
High speed spindles, and applications to magnetic drum computer components. Ls Le Ic RMSa

Bull S.A. Compagnie des Machines, 94 Avenue Gambetta, Paris, France
Punch card machines. Development of electronic computer components. Ls (5000) Le Dc RMSa

Clary Multiplier Corp., 408 Junipero St., San Gabriel, Calif. *C
Adding and multiplying machines, cash registers, electronic counters, automatic read-out devices for electronic computers, data-reduction apparatus, analog-to-digital converters. Ls (1700) Me (1939) DAc RMSa

Commercial Controls Corp., 1 Leighton Ave., Rochester 2, N.Y.
Mailroom equipment. "Flexowriter" electric typewriter with punched paper tape control. Ls Le Ic RMSa

Computation Centre, Univ. of Toronto, Toronto, Canada *C
Digital, electronic computers. Now operating: a Ferranti Electric automatic computer; Univ. of Toronto Model Electronic Computer; IBM installation. Ss (15) Se (1947) RPa Dc

Computer Control Co., 106 Concord Ave., Belmont, Mass.
Computers and computer components. Ss Se (1952) Dc RMSCa

Computer Research Corp., Subsidiary of National Cash Register Co., 3348 West El Segundo Blvd., Hawthorne, Calif. *C

Digital computers, computer components. Computing systems (general and special purpose, business or scientific), digital differential analyzers, magnetic components. CADAC (CRC102) general purpose computer and other computers. Ms (130) Se (1950) Dc RCMSa

Consolidated Engineering Corp., 300 N. Sierra Madre Villa, Pasadena 8, Calif. *C

Automatic electronic digital computers (Model 30-201). Digital and analog data handling and conversion systems (Sadic, Millisadic, etc.). Automatic translator magnetic tape to punched card. Ls (750) Me (1937) Dc RMSa *A

Eckert-Mauchly Division, Remington Rand, Inc., 3747 Ridge Ave., Philadelphia, Pa.

All-purpose electronic digital computers. Univac Factronic System, 8 sold, 4 installed as of 10/1/52. Ls (600?) Se (1946) Dc RCMSa *A SEE also Remington-Rand, Inc.

Electronic Associates, Inc., Long Branch, N.J. *C

Digital-to-analog converter (Model 417). Digital plotting system (Dataplotter). General and special purpose analog computers, and devices. Special purpose digital devices. Ms (350) Se (1945) DAc RMSa *A

Electronic Computer Div. of Underwood Corp., 160 Avenue of the Americas, New York 13, N.Y., and 265 Butler St., Brooklyn, N.Y. *C

Constructing four types of electronic digital computers (Elecom-100, -120, -200, and a data-handling computer). First Elecom 100 passed acceptance tests 11/22/52 at Aberdeen Proving Ground, including continuous run of 24 hours without error. Delay lines, pulse transformers, magnetic recording heads, magnetic drums, D.C. plug-in amplifiers. Ms (70) Se (1949) Dc RMSa SEE also Underwood Corp.

Engineering Research Associates, Inc., Division of Remington-Rand, Inc., 1907 West Minnehaha Ave., St. Paul, Minn., and 510 18th St. South, Arlington, Va. *C

Digital computers; ERA 1101 and 1103 electronic digital computers; the Logistics Computer. Magnetic storage systems, including magnetic heads, magnetic drums, etc. Shaft-position indicator systems, self-recording accelerometers, analog magnetic recording systems, data-handling equipment, special purpose communications equipment, pulse transformers. Ls (750) Se (1946) Dc RMCPSa *A SEE also Remington-Rand, Inc.

Felt and Trarrant Mfg. Co., Comptometer Division, 1735 North Paulina St., Chicago 22, Ill. *C

Adding-calculating machines, key-driven, electric and non-electric. Comptometer. Ls (1700) Le (1886) Dc RMSa

Ferroxcube Corp. of America, Saugerties, N.Y.

Ferrites; pulse transformer cores; computer components. Ms Se Ic RMSa

The Franklin Institute Laboratories for Research and Development, 20th St. & Benjamin Franklin Parkway, Philadelphia 3, Pa. *C

Fire control equipment. Special purpose analog computers, large and small scale. Digital computer components. Prototype construction. Ms (300) Se (1946) DAc RCa

General Ceramics and Steatite Corp., Keasbey, N.J. (near Perth Amboy, N.J.) *C
Magnetic cores for computer components; technical ceramics, insulators, etc. Ls (650) Le (1906) Ic RMSa *A

General Controls, 801 Allen Ave., Glendale 1, Calif. *C
Automatic controls (pressure, temperature, level, flow). Ls Cc RMSa

Gerber Scientific Instrument Co., 89 Spruce St., Hartford 1, Conn. *C
Graphical computer "Graphanalogue". Ss Se (1946) Ac RMSa

Hillyer Instrument Co., 54 Lafayette St., New York, N.Y.
Simulators, servomechanisms, sensing, computing, and actuating systems. DAICc RMSa

Intelligent Machines Research Corp., 134 So. Wayne St., Arlington, Va. *C
Devices for reading characters on paper, etc. Pattern interpretation equipment. Sensing mechanisms. Digital computer elements. Ss (6) Se (1951) Dc RCMSa *A

International Business Machines Corp., 590 Madison Ave., New York, N.Y. *C
Punch card machines. IBM Selective Sequence Electronic Calculator: dismantled 8/30/52. IBM Defense Calculator Type 701 (magnetic tape, magnetic drum, electrostatic storage). Card programmed calculator; electronic calculating punch Type 604. Data processing equipment. Process control equipment. Ls (38,000) Le (1911) Dc RMSa

International Telemeter Corp., 2000 Stoner Ave., Los Angeles 25, Calif. *C
Digital computer Type TC-1 (like Ordvac). Special devices for clerical and control applications. Metered and piped television. Ss (41) Se (1951) DIc RMSa

Leeds and Northrup, 4901 Stenton Ave., Philadelphia 44, Pa. *C
Automatic recorders and controls. Ls (3150) Le (1899) Cc RMSa

Logistics Research Co., 141 So. Pacific Ave., Redondo Beach, Calif.
Ic RMSa

Magnetic Metals Co., Hayes Ave. & 21st St., Camden, N.J. *C
Magnetic memory storage units for digital computers. Magnetic cores, tapes, laminations for magnetic amplifiers, servomotors, etc. Ms (380) Se (1942) Ic RMSa *A

The W.L. Maxson Corp., 460 West 34 St., New York, N.Y.
DAIc RMSa

Mellon Institute of Industrial Research, Multiple Fellowship on Computer Components, Univ. of Pittsburgh, Pittsburgh 13, Pa. *C
Ss (6) Se (1950) Dc RCa

Minneapolis-Honeywell Regulator Co., Industrial Division, 4580 Wayne Ave., Philadelphia 44, Pa. *C
Automatic controllers. Brown Instruments. Servo components used in computers. Recording and indicating instruments and control equipment. Ls (2000) Le (1859) Cc RMSa

Monroe Calculating Machine Co., Orange, N.J. *C
Desk calculating machinery. Electronic digital computer research. Monrobots. Ls (4000) Me (1925) Dc RMSa *A

National Cash Register Co., Main and K Sts., Dayton, Ohio, and elsewhere. *C
Cash registers. Accounting-bookkeeping machines. Adding machines. Purchaser of Computer Research Corporation. Ls (33,000) Le (1884) Ic RMSa

National Physical Laboratory, Electronics Section, Teddington, Middlesex, England *
Digital computers and associated equipment. Designer and builder of the Pilot Model of ACE (Automatic Computing Engine — high-speed, electronic, digital). Collaborates with English Electric Co. Ls (1000; Elecnc. Sec., 25) Le (1900; Elecnc. Sec., 1948) DIc RCPMa

Naval Research Laboratory, (Anacostia, Md.), Washington 25, D.C. *C
Ls (3000) Me (1923) Ic RCPa

Nuclear Development Associates, 80 Grand St., White Plains, N.Y. *C
Design and development of Circle Computer. Associated with Hogan Laboratories. Ss Se DIc RMSa

Olivetti Corp. of America, 580 Fifth Ave., New York 36, N.Y., and associated companies elsewhere. *C
Desk adding, calculating, and printing machines. Fully automatic printing calculators. Ls (6000+) Le (1908) Dc RMSa

Pennsylvania State College, X-Ray and Solid State Lab., Dept. of Physics, State College, Pa. *C
X-RAC computer for crystal electron density functions. S-FAC for structure factor calculations. R-PAC (recorder playback computer) for Patterson function interpretations. Ms (55) Se (1947) Ac RPa

George A. Philbrick Researches, Inc., 230 Congress St., Boston 10, Mass. *C
Electronic analog computing equipment and components. Ss (5+) Se (1946) Ac RCMSa *A

Radiophysics Laboratory, University Grounds, Chippendale, New South Wales, Australia
Designed and constructed electronic digital computer, now in operation. Dc RCMa

The Rand Corporation, 1700 Main St., Santa Monica, Calif. *C
Constructing an electronic digital computer of the type of the Institute for Advanced Study. Ls (500) Se (1946) DASIc RCPa

Raytheon Manufacturing Co., Waltham, Mass. *C
Radar, fire-control, microwave equipment. Big fast electronic digital computers (Raydac). One delivered to Pt. Mugu, Calif. Ls (18,000) Me (1922) DAc RMSa

Remington Rand, Inc., 315 4th Ave., New York 10, N.Y., and elsewhere. *C
Punched card machines, office machines, electronic digital computing machines (Univac Factronic System, ERA 1103), servomechanisms. Ls (30,000 of which 1800 on computers) Le DASc RCMSa SEE also Eckert-Mauchly Division, and Engineering Research Associates. *A

Servomechanisms, Inc., Post and Stewart Aves., Westbury, N.Y. *C
Automatic control systems, and components. Analog computers.
Ls (700) Se (1946) ASc RMSa

Sociéte d'Electronique et d'Automatisme, 138 Blvd de Verdun, Courbevoie, Seine, France. *C
Analog and digital computers. Servomechanisms, electronic equipment for machine tools. Ms (300) Se (1948) DASc RMSa

Sperry Gyroscope Co., Great Neck, N.Y. *C
Ordnance; fire-control equipment. Automatic controls. Navigation equipment, sea and air. Radar, Loran, gyrocompasses.
Ls (16,000) Le (1910) Ac RMSa

Taller and Cooper, 75 Front St., Brooklyn, N.Y. *C
Data recording and conversion systems, printers, perforators. Toll equipment for bridges, highways. Designing a toll station computing validator. Ms (250) Me (1926) DIc RMSa

Tally Register Corp., 5300 14th Ave., N.W., Seattle 7, Wash. *C
Special purpose business machines and instruments. High-speed data-reduction system for telemetering applications; electric sensitive tape recorder; tape-to-card converters; binary-decimal converters; data input devices. Ss Se DICc RMSCa

Telecomputing Corp., 133 E. Santa Anita Ave., Burbank, Calif. *C
Automatic data reading, recording, and plotting equipment (telereader, Telecordex, Teleplotter). Ms (160) Se (1947) Dc RMPa

John E. Thompson and Associates, 7210 So. Yates Ave., Chicago 49, Ill. *C
Ss (10) Se (1946) Ac Ma

Ultrasonic Corp., 61 Rogers St., Cambridge 42, Mass. *C
Automatic feedback control development and equipment. Ms (450) Se (1945) DACc RMSa

Underwood Corp., One Park Ave., New York 16, N.Y.; General Research Lab., 56 Arbor St., Hartford 6, Conn.; and elsewhere. *C
Accounting machines, adding machines, typewriters. Elliott-Fisher and Sundstrand machines. Underwood electric typewriters, used in Harvard Mark II calculator. Ls (company 10,000; laboratory, 100) Le (1895) DIc RMSa

U.S. Air Force, Inst. of Technology, Wright-Patterson Air Force Base, Dayton, Ohio *C
Electronic strategy machine, conceived by L.I. Davis. Philbrick and Reac equipment on hand. Ms (300) Se (1946) DAIc Ga

U.S. Air Force, Office of Air Research, Wright-Patterson Air Force Base, Dayton, Ohio
Assembling a computing laboratory. Ms Se Dc RCPa

University of Sidney, Dept. of Electrical Engrg., Section of Mathematical Instruments, Sydney, New South Wales, Australia
Analog computers. Ac Ra

Victor Adding Machine Co., 3900 No. Rockwell St., Chicago 18, Ill. *C
Adding machines. Ls (1600) Le (1918) Dc RMSa

Wallind-Pierce Corp., 1928 Pacific Coast Highway, Lomita, Calif. *C
Digital-to-analog, and analog-to-digital translators. Digital and analog computers, magnetic amplifiers, etc. Ss (18) Se (1951) DASc RCMSa

Wang Laboratories, 296 Columbus Ave., Boston 16, Mass. *C
Magnetic delay-line memory units. Digital signal generators. Multiple scalers. Static magnetic memory systems and other devices. Ss Se (1951) Dc RCMSa

George Washington Univ., Logistics Research Project, 707 22nd St., Washington 6, D.C. *C
Relay computer with magnetic drum memory. Data-handling machines. Fast output. Ss Se (1949) Dc RCPa

Watson Scientific Computing Laboratory, 612 West 116 St., New York, N.Y. *C
The pure science department of International Business Machines. Simultaneous linear equation solver. Astronomical plate measuring machine. Ms (75) Se (1945) DAc RCPa

Wharf Engineering Laboratories, Fenny Compton, Warwickshire, England
Magnetic drums for computers. Ss Se Dc RMSa

BACK COPIES OF "THE COMPUTING MACHINERY FIELD"

Vol. 1 no. 1 (Sept. 1951), vol. 1 no. 2 (Feb. 1952), and vol. 1 no. 3 (July 1952) were entitled the "Roster of Organizations in the Field of Automatic Computing Machinery", and contained that only. They were produced by ditto process, are now out of date and out of print, and are completely replaced by the "Roster of Organizations" published in vol. 1 no. 4.

Vol. 1 no. 4 (Oct. 1952) was the first issue bearing the new title "THE COMPUTING MACHINERY FIELD". It contained a cumulative, up-to-date "Roster of Organizations" (a list of about 140), two articles, and a book list (mentioning 15 publications). Single copies of that issue are available at $1.25; or a subscription may be specified to begin with that issue.

BRAINS: ELECTRONIC AND OTHERWISE

by A. S. Householder
Oak Ridge National Laboratory

The existence of operable, automatic electronic computers, and the fact that they are in demand, both testify eloquently to the degree of elaboration of the technology capable of creating and employing them. Amazing as they are, however, those of us who deal with these automata recognize fully how limited they are in intellect, and how essential is the human brain which directs their cerebration. The indispensability of the human brain in other phases of technology, the need for sound professional training if our technological civilization is to thrive or even survive, are matters that scarcely require an argument.

Yet, by a curious and tragic paradox, at just this time the facilities for technical training are in critical danger in this country. One source of danger lies in overcrowded classrooms, a shortage of qualified teachers, and generally inadequate support, financial and otherwise, for the educational system. This is serious, but widely recognized, and one may hope that remedies, in some measure, will be found.

Another danger is no less real and far more insidious. It springs from an attack upon education at its foundations, in the public schools; an attack that is launched by countless public school administrators over the country, and instigated by the professors of education in the teachers colleges. It takes many forms: degradation of classroom standards; dilution of curricula; selection of teachers on the basis of courses in "education", with little or no regard for preparation in the subjects to be taught; pressure upon colleges to lower their entrance requirements and accommodate all high school "graduates", whatever the "graduation" may have signified. All this is carried out in the name of "democracy", "citizenship", "social and personal adjustment", or any gilded phrase you may propose.

Mathematical, engineering, and other professional organizations are considering what steps can be taken to increase the supply of soundly trained personnel. Meanwhile students who wish to enter a technical field, are discovering in college that their high school training has not provided the background expected of them. It is time for the pendulum to swing back, and individuals can contribute at least by investigating the public schools in their own localities and insisting that among the course offerings there be some solids with the froth.

(THE COMPUTING MACHINERY FIELD invites discussion of this important and controversial subject).

WHO'S WHO IN THE COMPUTING MACHINERY FIELD: SECTION 1 -- PROGRAMMING

(First edition, cumulative, information as of December 20, 1952)

This is the first section to be published of a Who's Who of individuals in the computing machinery field. Other sections will be published soon. The purpose of this Who's Who is to make it easier for all persons interested in the computing machinery field to get in touch with each other in appropriate ways.

Contents. This list consists of persons who have reported as a main interest "programming", that is, preparing instructions or orders so that automatic computers will solve problems. Only those persons whose response to inquiry was received by Dec. 20 have been included in this list. Information about other persons will be printed in an early issue of THE CMF.

Reply Card. The form of the reply post card for gathering information for the Who's Who was about as follows:

Name (please print) ____________________

Address ____________________

Organization (& address)? ____________________

Title? ____________________ Year of birth? __________

MAIN INTERESTS:
( ) Design
( ) Construction
( ) Applications
( ) Sales
( ) Electronics
( ) Mathematics
( ) Business
( ) Programming
( ) Other (specify): ____________________

College or last school? ____________________
Years of experience in computing machinery field? __________
Occupation? ____________________ (Enclose more information about yourself if you wish -- it will help in your listing.)

( ) Please send me on approval a copy of the bimonthly THE COMPUTING MACHINERY FIELD. I will subscribe at $3.50 a year (U.S., Canada; $4.50 elsewhere) if I like it, or return the copy within seven days.

If you are interested in any phase of computing machinery, robots, cybernetics, or automation, we shall be glad to receive the above information about you; and if you have previously sent us information which should be changed or improved, we shall be glad to receive the changes. If convenient, please use a post card (or post card size) to write us, so that your information may be filed easily, without copying. Send the card to: E.C. Berkeley, Editor, THE COMPUTING MACHINERY FIELD, 36 West 11 St., New York 11, N.Y. Your listing does not depend in any way on your subscribing to THE CMF though of course your subscription will be welcome.

Entry. Each entry in the Who's Who when it becomes complete contains: name / title, organization, address / interests / year of birth, college or last school (background), years in field, occupation. The address has been substantially contracted to avoid the nuisance of unwanted mail. In cases where no information was given (for example, about occupation) a "-" denotes omission.

Abbreviations. Since a great deal of information is to be presented, abbreviations have been extensively used. Nearly all these abbreviations can be easily guessed, like those in a telephone book. The letters A,B,C,D,E,M,P,S stand for main interests "Applications, Business, Construction, Design, Electronics, Mathematics, Programming, Sales" respectively. Translation of some more of the abbreviations is given at the end of the list.

Geographical Arrangement. At the present time, many computer people interested in programming are trying to achieve greater communication among themselves. Therefore, this section has been arranged geographically.

Liability. Although we have tried to make each entry complete and accurate, we assume no liability for any statements expressed or implied.

Corrections. Since this is the first issue of our Who's Who, many errors and inconsistencies doubtless remain. We shall be very grateful for any information, additions, or corrections that any reader is able to send us.

Roster

MAINE, NEW HAMPSHIRE, VERMONT — No one

MASSACHUSETTS: Adams, Charles W / asst prof dig compn, Dig Comp Lab, MIT, Camb / AMP, log des, training / '25, MIT, 5, -
Arnow, Jack A / staff, Dig Comp Lab, MIT, Camb / AMP / '27, MIT, 2, -
Attridge, Walter S Jr / res engr, Dig Comp Lab, MIT, Camb / ADEP / '27, MIT, 2, -
Bar-Hillel, Yehoshua / res assoc, Res Lab Elecncs, MIT, Camb/ P, mach transln, tchg / '15, Hebrew U (Jerusalem, Israel), 0, -
Bloch, Richard M / mgr, Comp Dept, Raytheon, Waltham / ABCDEMPS / '21, Harv, 10, -
Briscoe, Howard W / staff, Dig Comp Lab, MIT, Camb / MP, aplns to geophysics / '30, MIT (BS in geophysics), 2, -
Carter, Wm Caswell / sr engr, hd Log Des, Comp Dept, Raytheon, Waltham / DMP, tchg / '17, Harv (PhD'47) (U Chic, Oxfd, Colby), 5, mathn
Combelic, Donn / mathn, Dig Comp Lab, MIT, Camb / AMP / '18, MIT, 2, -
Comerford, Emma E / mathn, Compg Serv Grp, Raytheon, Waltham / MP, acceptance tstg / -, Bost Coll, 4, mathn
Demurjian, Malcolm S / res engr, Dig Comp Lab, MIT, Camb / AMP / -, Colum U, 3, mathn
Dieterich, Ernest J / hd, Res Sec, Comp Dept, Raytheon, Waltham / ADEMP, res in logic, components / '23, Harv (PhD'53, physics), 5, physicist
Ellis, Murray / sr engr, Comp Dept, Raytheon, Waltham / ABDMP / '23, Yale (MS'48), 6, comp engr
Everett, Robert Rivers / assoc dir, Dig Comp Lab, MIT, Camb / DEP / '21, MIT, 7, -
Franklin, Philip / prof, Math Dept, MIT, Camb / MP / '98, CCNY, Princeton U, 5, prof math
Frankovich, John M / prgrmr, Dig Comp Lab, MIT, Camb / AMP / '28, MIT, 2, grad stud
Gaudette, Charles H / res engr, Dig Comp Lab, MIT, Camb / AP / -, MIT (BS Math), 2, -
Goldberg, Bernice / mathn, Geophysics Res Div., USAF Camb Res Cr, Camb / MP / '27, Radcliffe (MA) (NYU, MIT), 1, mathn
Heart, Frank E / engr, Dig Comp Lab, MIT, Camb / AP, contr sys, log des / -, MIT, 2, elec engr

Hellman, Maurice Hirsch / "DIC" staff member, Instrmn Lab, MIT, Camb / AMP / '18, Harv Grad Sch, 1, -
Israel, David Robinson / sec chf, Aplns Grp, Dig Comp Lab & Lincoln Lab, MIT, Camb / ADP / '27, MIT, 3, elec engr
Kay, Alan F / mathn, McMillan Lab, So Hamilton / AMP / '25, Harv, ½, -
Kopley, Edwin S / mathn, Dig Comp Lab, MIT, Camb / AMP, training prgrmrs / '19, Colum U, 2, mathn
Levin, Joseph L / staff, Compg Serv Grp, Raytheon, Waltham / AMP / '15, U Chic (PhD'40) (BRL, APG, Md; NBS, Wash, D C), 8, mathn
Porter, Jack D / sr prgrmr, Dig Comp Lab, MIT, Camb / AMP / '19, Harv, 3, mathn
Reynolds, George E / mathn, USAF Camb Res Cr, Camb / MP, Monrobot comp / '12, RI State U, 3, mathn
Rose, Lewis J / engr, Comp Dept, Raytheon, Waltham / AP / '27, Cornell U, 3, -
Rosen, Leo / vp, ANelex Corp / ABCDEPS, data handlg / '16, MIT, Camb, 12, elecncs engr
Walquist, Robert L / sr engr, Dig Comp Lab, MIT, Camb / ADP / '28, MIT (MS'51), 2, elec engr
Yuryan, Joseph B / chf mech engr, Res & Dev, Thos Taylor & Sons, Inc, Hudson / AP / '19, Northeastern U (BS'42), 0, mech engr

RHODE ISLAND: Bennett, Albert Arnold / prof math, Brown U, Providence, & civilian expert, Aber Pvg Gr, Md / MP / '88, Princeton, 20, mathn

CONNECTICUT: Lincoln, Charles G / asst acty & chmn, Elecncs Committee, Travelers Ins Co, Hartford / ABEMP / '15, Wesleyan, 3, acty
Olofson, Earl Clifford / engrg plng superv, Rem Rand, Norwalk / ABDPS / '14, Lehigh U, 17, mech engr

NEW YORK: Allen, Wm W / -, Rem Rand, N Y / ABDP, math as apld to bus, Univac / '14, NYU (Sch Bus Adm), 2, -
Andrus, Wm E Jr / tech engr, Sci Compn Lab, IBM, Endicott / AMP / '23, Syracuse U, 4, mathn
Astrahan, Morton M / proj engr, Engrg Lab, IBM, Pkpsie / ACDP,/ '24, Northwestern U, 2, engr/ Chmn, IRE Profl Grp on Elecnc Comps
Baker, Charles T Jr / techl engr, IBM, Pkpsie / ADEP, automation / '21, U Pa, 1, -
Bashe, Charles J / proj engr, IBM, Pkpsie / ADP, log des / '26, Purdue U, 3, elecncs engr
Benthine, Miss Frances C / res, Rem Rand, N Y / BP, res / '19, NYU, 2, -
Blodgett, Edwin O / chf dev engr, Comml Contr Corp, Rochester / DP, des input-output mach / '06, -, -, -
Brooks, Jack Edward / des engr & hd of comp, Republic Aviation Corp, Hicksville / AMP, physics / '24, Oxfd U (PhD, physics; Rhodes schol; Tex A & M, BSEE), 1, engr
Buchholz, Werner / proj engr, IBM Engrg Lab, Pkpsie / ABDP / '22, Calif Inst Tech, 5, elec engr
Clancy, J B / secy, Royal Liverpool Ins Grp, N Y / ABP / '99, NYU, 35, ins acct
Clark, H Kenneth / admv asst, Watson Sci Comp Lab, IBM, N Y / AP / '09, Colum U, 20, -
Cumming, L G / techl secy, Inst Radio Engineers, N Y / ABEP / '03, MIT (Cmdr USNR retd), --, elecncs engr
Diesen, Carl E / engr, Bell Aircraft Corp, Tonawanda/ AMP / '21, U Wisc, 1, engr
Eckert, Wallace J / dir, Watson Sci Comp Lab, IBM, N Y / ABCDEMP / -, Yale, 25, -
Feigenbaum, David / res aerodynamicist, Cornell Aero Lab, Buffalo / AMP / -, CCNY & U Buffalo, 2, aero engr
Feitler, Joseph / cust engr, IBM, N Y / ABEMP / '25, CCNY, 6, engr
Fusfeld, Muriel M / jr mathn, Control Instruments Co, Bklyn / AMP / '28, NYU Grad Sch, 2, mathn
Gerhard, Walter / techl engr, Engrg Lab, IBM, Pkpsie / ABDP / '22, Cooper Union, ½, engr

Gray, Walter E, Jr / mathn, Engrg Res Lab, IBM, Pkpsie / AMP / '01, U Pa Grad Sch, 1, mathn
Guterman, Frederick H / mgr plng, Arma Corp, Garden City / P / '21, Cornell U, 3, -
Haselton, M L / vp, The Teleregister Corp, N Y / ACDEP, invention, data handlg, commun / '92, -, 20, engr
Horn, Virgil M / sec hd, Actl Div, Met Life Ins Co, N Y / AP, procedure plng / '09, Yale (Purdue), 12, acty
Horowitz, Jacob / mathn, The Lummus Co, N Y / ABMP, maint technqs / '17, Colum U, 5, mathn
Hunter, George Truman / staff, Apld Sci Dept, IBM, N Y / ABPS / '18, U Wisc (PhD), 3, -
Hurd, Cuthburt C / dir, Apld Sci Dept, IBM, N Y / ABDMPS / '11, U of Ill (PhD), -, mathn
Johnson, J R / engr, Engrg Lab, IBM, Pkpsie / DP / '28, U Wisc, 3, res engr
Koff, Jack / assoc, ECBerkeley & Assoc, N Y / ACDEP, robots / '29, CCNY, 2, stud
Kraft, Hans / aerodynamicist, Turbine Div, Gen Elec Co, Schenectady / AMP / '98, Tech U Munich, 10, engr
Ladd, Daniel W / mathn, IBM, N Y / AMP / '25, Colum U, 4, mathn
Matheny, James H / mathn, The Texas Co, Fishkill / AMP / '24, Mich State Coll, 2, mathn
Muses, Charles A / none / DMP, log / '19, Colum U (PhD), 3, res
Papworth, William S / mng editor, The Journal of Accountancy, N Y / ABP / '11, Syracuse U, 0, editor
Pippenger, C R / proj engr, Assocd Mdse Corp, N Y / ABCDP, procurement / '18, MIT, (Mich State, Harv), 5, engr
Price, Clifford H / sr meth engr, Eastman Kodak Co, Rochester / ABMP, payroll acctg, prodn contr/ '09, Roch Inst of Tech, 15, superv tabg & meth
Quarles, Donald A, Jr / sr mathn, Apld Sci Dept, IBM, N Y / MP / '22, Yale (BS,MA'48), 4, -
Reynolds, A C, Jr / techl engr, IBM Lab, Endicott / DEMP, log des, sys orgn / -, Harv, 2, engr
Rochester, Nathaniel / dev engr, IBM, Pkpsie / ADP / '19, MIT, 5, -
Sarahan, Bernard L / mathn, Apld Sci Dept, IBM, Pkpsie / ABDMPS/ '22, Harv, 7, -
Seares, Al N / vp & dir sales & serv, Rem Rand, N Y / ABPS / '03, U Calif, 2, executive
Seeber, Robert R, Jr / sr staff mem, Watson Sci Comp Lab, IBM, N Y / ABCDEMP / '10, Harv, 19, -
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Sheldon, John W / techl asst, IBM, N Y / AMP, technq compg / '23, Colum U, 4, mathn
Skillman, Sherwood / mathn, Apld Sci Dept, IBM, N Y / AMP, Type 701 / '23, N C State Coll, 4, prgrmr
Smith, Edward J / res assoc, Polytechnic Inst, Bklyn / ADP, res, educ / '20, Bklyn Poly (D Eng), 7, -
Smith, Joseph C / techl speclst, Fut Dem Dept, IBM, N Y / ABMP / '25, NYU (Dartmouth), 3, mathn
Stieber, Alexander / res physicist, Cornell Aero Lab, Buffalo / AMP / '22, Harv (Bost U, Drew U), 2, res physicist
Tatum, Liston / admv asst, IBM, N Y / ABPS / '19, Northwestern U, 3, mathn
Thober, Frank W / sr procedure analyst, Met Life Ins Co, N Y / ABP / '11, Webb Inst Of Nav Arch, 1, -
Wells, Edward H / vp & acty, Mutual Life Ins Co, N Y / MP / '01, Princeton U, 10, acty
Williams, John A / mgr Meth & Stat Dept, Niagara Mohawk Power Corp, Syracuse / ABEP, printing / '89, -, 30, -

NEW JERSEY: Bitner, Ralph E / patent atty, none, West Englewood/ EMP / '93, Penn State (BS, MS), 14, patent atty
Cherlin, George / actl stud, Mut Ben Life Ins Co, Newark / ABMP / '24, Rutgers U, 3, clerk

Diebold, John T / -, Harbridge House, Weehawken?/ ABP / '26, Harv Bus Sch, 3, mgt consultnt
Estrin, Gerald / res engr, Elecnc Comp Proj, Inst Adv Study, Princeton / ACDEMP / '21, U Wisc, 3, -
Gabriel, Edwin Zenith / proj engr, Curtiss-Wright Corp, Electncs Div, Montclair? / ABDEMP / '13, Stevens Inst Tech, 4, elec engr
Herrick, Harlan L / sr mathn, IBM, - / MP / '22, Yale, 4, mathn
Leggoe, Alfred, Jr / cust engr, IBM, - / ADEP / '21, Drexel, 5, -
Marsh, Charles J, Jr / asst dir sales, Elecnc Assoc, Long Branch / ACDEMPS, input & output dev & techq / '17, Chillon Coll, 7, sales engr
Mosesson, Z I / chf actl asst, Prudential Ins Co of Amer, Newark / BP / '11, Harv, 5, acty
Rawson, Constance K / none, Haddonfield / P / '24, Vassar, 2, housewife
Schrage, R W / chem engr, Tech Serv Div, Esso Std Oil Co, Linden / AMP / -, Colum U, 1 -
Thiessen, Henry B / asst mathn, Mut Ben Life Ins Co, Newark / ABP / '06, Brown U, 12, acty
Tryon, John G / staff, Bell Tel Labs, Murray Hill / DMP, military comps/ '20, Cornell, 1, engrg physicist
Weinstein, Joseph / chf, Mathl Unit, Engrg Labs, Signal Corps, Ft Monmouth / AMP / '15, Rutgers (MS in EE, '53; CCNY), 4, mathn

PENNSYLVANIA: Allen, Leonard G / asst res engr, Res Div, Burroughs Adding Mach Co, Phila / ADMP / '24, U Mich, 1, mathn
Casale, Ernest C / hd, Math Sec, Frankford Arsenal, Phila / AMP / '19, U Pa, 2, mathn
Chin, Quun S / staff, Towers, Perrin, Forster & Crosby, Phila / ABMP / -, Harv, 3, mat
Cowgill, Daniel E / assoc res engr, Res Div, Burroughs Adding Mach Co, Phila/ ABMPS, analysis, evaluation / '20, Bost U MA (Math), 5, -
Curry, Haskell B / prof math, Pa State Coll / MP, mathl log / '00, U of Göttingen (Germany), 4, mathn
Dempsey, Carl W / mathn, Sun Oil Co, Newtown Sq / AMP / '17, Lebanon Valley Coll, 2, res mathn
Eisman, Sylvan H / mathn, Frankford Arsenal, Phila / AEMP / '25, U Pa, 2, mathn
Engel, Frank A, Jr / superv scientist, Contr Sec, Physics Dev Dept, Westinghouse Atomic Pwr Div, Pgh / ADMP / '17, U of Pgh, 3, -
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Fehr, Barbara Nicholson / none / MP / -, Bryn Mawr, 3, homemaker
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Goldberg, Winifred J / prgrmr, Eckert-Mauchly Comp Div, Phila / AMP / '30, U Pa, 2, prgrmr
Hand, George C, Jr / proj engr, Technitrol Engrg Co, Phila / ACDEP / '19, U Pa (Moore Sch of EE), 3, engr
Harder, E J / consulting engr & dir, Analytical Sec, Westinghouse Elec Corp, E Pgh / ACDEMPS / '05, Cornell, U Pgh, 25, elec engr
Hopper, Grace Murray / sys engr, Rem Rand, Phila / ABMP / '06, Yale (PhD '34, MA '30, Vassar), 8, mathn
Holt, Charles C / sr res fellow, Sch of Indust Adm, Carnegie Inst Tech, Pgh / ABP, economics / '21, MIT (U Chic), ½, engr
Houghton, Donald B / chf, Analysis Sec, Franklin Inst Labs, Phila / AMP, log des / '17, Wash & Lee U, -, apld mathn
Huff, Morgan W / prgrmr, Eckert-Mauchly Comp Corp, Phila / ABPS / '25, U Md, 2, prgrmr
Hunt, Donald F instructor in elec engr, U Pa, Phila / MP, educ, diffl analyzer, card prgmd calc / '25, U Pa, 3, instructor

Katz, Arthur A / asst dir, Univac Applns Dept, Eckert-Mauchly Comp Corp, Phila / ABMP / '25, U Pa, 6, -
Kranzley, Arthur S / assoc res engr, Res Div, Burroughs Adding Mach Co, Phila / ABP / '27, Drexel Inst Tech, 2, sys analyst
Lee, Cedric F / writer, Eckert-Mauchly Div, Phila / ABDP / -, U Ill, 3, writer
Leas, J Wesley / mgr, Compg Sys, RCA Victor, Camden NJ / ABDP, engrg / '16, Ohio State U, 2, elec engr
Logan, J Robert / sys analyst, Univac Div, Rem Rand, Phila / DEP, instrmn, sys studies / '23, U Pa (Physics), 3, -
Mayer, David B / res engr, Philco Corp, Phila / AMP, computational anal / '24, Oberlin (BA), U Pa, Temple U, 2, -
McFadden, David J / prgrmr, Eckert-Mauchly Div, Phila / ABPS / '27, Temple U, 2, prgrmr
Middleton, Marshall, Jr / engr, Westinghouse Elec Corp, Pgh / AMP / '23, U Pgh, 2, engr
Miller, Alfred Eugene / asst res engr, Res Div, Burroughs Adding Mach Co, Phila / AMP, log des, philosophy & theory of comp mach / '29, U Pa, 1, mathn & logician
Mitchell, Herbert F, Jr / dir, Univac Aplns Dept, Eckert-Mauchly Div, Phila / ABMPS / '13, Harv (PhD), 6, elecnc engr
Mott, Lucile E / asst res engr, Res Div, Burroughs Adding Mach Co, Phila / ADP / -, Bryn Mawr Coll, 9, -
Muskat, Morris / tech asst to vp of prodn, Gulf Oil Corp, Pgh / AP / '06, Calif Inst of Tech, -, -
Newhart, Vincent R / prgrmr, Eckert-Mauchly Div, Phila / ABPS / '25, Muhlenberg Coll, (Temple Med Sch), 1, prgrmr
Petersen, Richard M / prgrmr, Eckert-Mauchly Div, Phila / ABP / '25, Bucknell U, 2, prgrmr
Pfeilsticker, Robert C / mathn, Frankford Arsenal, Phila / AMP / -, Temple U, 2, mathn
Ridgway, Richard K / prgrmr, Eckert-Mauchly Div, Phila / AEMP, log & other thought analogues / '26, Swarthmore, 1, prgrmr
Robbins, Leon C, Jr / asst res engr, Res Div, Burroughs Adding Mach, Phila / MP, log / '23, U Pa, 2, mathn
Rosenthal, Paul / prgrmr, Eckert-Mauchly Div, Phila / ABMP / '28, Temple U, 2, prgrmr
Rubinoff, Morris / asst prof, U Pa, Phila / ACDEMP / '17, U Toronto, 6, asst prof
Rutledge, Joseph D / sys engr, Eckert-Mauchly Div, Phila / ABDMP, log des / '28, Swarthmore, 2, sys engr
Sardinas, August A / assoc res engr, Res Div, Burroughs Adding Mach Co, Phila / MP, information theory / '22, U Pa, 3, mathn
Shafritz, Arnold / asst res engr, Res Div, Burroughs Adding Mach Co, Phila / DMP / '26, U Pa, 1, log designer
Smith, Robert W, Jr / mathn & superv, Comp Lab, U S Bur of Mines, Pgh / AMP / '16, Temple U (U Pa), 4, mathn
Steinberg, Bernard D / proj engr, Philco Corp, Phila / EMP, log des, electnc res & dev / '24, MIT, -, -
Thomsen, D L, Jr / asst prof, Penn State Coll / AMP, tchg / '21, MIT, 1, teacher
Woodbury, Max A / assoc prof, Stat Dept, U Pa, Phila / ABMP, mathl stat / '17, Mich (PhD'48; Inst. Adv Study '49), 0, math statcn
Woltman, Richard D / sys engr, Eckert-Mauchly Div, Phila / ABMPS / '24, Swarthmore, 6, mathn

DELAWARE: Beutler, John A, Jr / -, Du Pont Co, Wilmington / EMP / '23, Oreg State Coll, 2, engr & mathn

MARYLAND: Bilsborough, Barbara C / mathn, BRL, APG / AP / '16, Brown U, 10, prgrmr
Bitterli, Charles V / assoc mathn, Johns Hopkins U, Silver Spring / P / '22, Loyola Coll, 4, Maddida-Reac prgrmr
Cheydleur, B F / chf, Apld Math Div, Nav Ord Lab, Silver Spring / ADMP / '12, U Wisc, 16, mathn
Cramer, George F / staff scientist, Engrg Res Assoc, Chevy Chase? / AMP / '03, U Mo (PhD), 3, mathn
Cushen, Walter Edward / operns analyst, Operns Res Ofc, Silver Spring / MP, log processes / '25, Westn Md Coll (U of Edinburgh), 3,. -
Dederick, L S / assoc dir, BRL, APG / AMP / '83, Harv (PhD), 25, mathn
Elgot, Calvin C / mathn, Nav Ord Lab, Silver Spring / MP / '22, Colum U, 1, mathn
Eniac, Joseph / -, Compn Center, APG / MP / -, U Pa, 10, mathn
Gainen, Leon / prgrmr, Comp Lab, NBS, Silver Spring? / MP / '23, Geo Wash U, 4, mathn
Harrison, Joseph O, Jr / hd, Compn Lab, Operns Res Ofc, Chevy Chase / AMP / '14, Colum U, 7, mathn
Lotkin, Mark / dep chf, Analysis Branch, BRL, APG / AMP / '12, NYU, 7, apld mathn
Marshall, Byron O, Jr / operns analyst, Operns Res Ofc, Johns Hopkins, Chevy Chase? / DEMP / '22, Harv, U Pgh, 6, mathn
Masincup, Mrs Minerva S / sec chf, Bell Relay Comps, BRL, APG / P / '11, Juniata Coll, 11, mathn
Reitwiesner, Homé M (Mrs Geo W) / prgrmr, BRL, APG / AMP / -, Randolph-Macon Women's Coll, 6, mathn
Reitwiesner, George W / prgrmr, BRL, APG / AMP / -, Harv Grad Sch, 5, mathn
Smith, Norman H / math teacher, Dept of Math, US Naval Academy, Annapolis / MP / '18, U of Iowa (MS'49), 1, teacher
Steiner, Otto T / mathn, NBS, Silver Spring? / MP / '17, Geo Wash U, 4, math prgrmr
Stickell, Edward E / orgn and meth examr, Soc Sec Admn, Baltimore / ABP / '07, Johns Hopkins U, 4, admnr
Williams, Samuel B / consulting, elec engr, Chevy Chase / ABCDEMPS / '81, Ohio State U, 14, consulting engr / Pres, Assocn for Compg Mach

WASHINGTON, D.C.: Alt, Franz L / asst chf, Apld Math Div, NBS / MP / '10, U of Vienna (Austria), 7, mathn
Cannon, Edward Whitney / princ investigator, Logistics Res Proj, Geo Wash U / ADEMP / '07, -, 8, mathn
Chrisman, C H / mathn, Nav Res Lab / AMPS / '15, Roanoke Coll (Tulane U), 6, mathn
Codd, Edgar Frank / apld sci rep, IBM / ADPS, operns res / '23, Oxfd U, 3, mathn
Difford, Lionel / chf, Prodn Unit, Proj SCOOP, NBS / EMP / '20, Ohio State U, 1, mathn
Dunaway, Edward G / -, USAF Comptroller / AP / '23, Geo Wash U, 3, statn
Duncombe, Raynor L / astron US Nav Obsvy / AMP / '17, Yale U (Wesleyan U, Iowa State U), 10, astron
Eddy, Robert P / mathn, Apld Math Lab, David Taylor Model Basin / AMP, Univac coding / '19, Brown U, 4, prgrmr
Finnie, C Herbert, Jr / prgrmr & operator (Univac), DCS-Comptroller, Hq, USAF / AEMP / '30, SW Tex State (BS'51) (2nd Lt AF), prgmr & operator
Fisher, Harold C / -, Hq, USAE / AMP / '23, Harv, 2, capt USAF
Frankel, Morris / statn, US Weather Bur / AP, Apln to Phy Scis / '10, -, 8, statn
Gallaher, John F / Offc of Nav Material, Navy Dept / ACDEMP, high-speed printed output / '04, Harv, 1, US Nav Officer (capt USN)
Gridley, D H / hd, Dig Meth Sec, Nav Res Lab / ACDEMP / '17, Purdue U, 9, engr
Hammersmith, John L / mathn, Nav Res Lab / ADMP / '29, U of Mich (Geo Wash U), 1, mathn
Hertz, Hans G / -, US Nav Obsvy / AMP / '15, Yale U (PhD), 9, astron
Heiser, Donald H / chf, Elecns Sys Sec, US Census Bur / ADP, Univac operations / '09, Oberlin, 7, superv

Highley, A E / analyst, Dept Defense / AP / '14, - (PhD), 11, -
Jones, Robert Stanwood / prgrmr & operator (Univac), Hq, USAF / AMP / '26, Northeastern U (BS'50), 1, prgrmr & operator
Kelley, James E, Jr / 2d Lt, Sys Procedure Sec, AFAPA, USAF / AMP / '29, Providence Coll, 1, prgrmr
Lee, Chuck H / AP / mathl statn, Census Bur / AP /-,Amer U, 9, prgrmr
Moser, Nora B / mathn, Army Map Serv / P / '19, U Chic, 2, prgrmr
Natrella, Joseph V / chf, Sys Procedure Sec, Hq, USAF / ABMP / '19, Amer U (U Pa), 8, mathn
Pardo, Isador / -, Mathl Compn Br, Plng Res Div, USAF / MP / '27, U Wisc (MA math), 2, mathn
Pollack, Solomon Leonard / mathn, NBS / MP / -, Geo Wash U, 2, mathn
Rabinowitz, Philip / mathn, NBS / MP / '26, U Pa, 2, mathn
Rixse, John A / analyst, Dept of Defense / ABDMP, orgnzn of comp installations / '23, Geo Wash U, 5, govt analyst
Rossneim, Robert J / techl aide, Ofc of Nav Res / ADEMP, logistics / '25, Swarthmore Coll, 3, -
Schnell, Emil D / chf, Mathl Compn Br, USAF / MP / '13, Geo Wash U, 5, mathn
Seward, James S / -, Naval Res Lab / ADMP / '25, U Mich, 3, mathn
Spencer, John W H / chf, Mathl Compn Br, Army Map Serv / AMP / '19, Geo Wash U, 12, mathn
Stuart, Donald G / chf, Prgmg Sec, Army Map Serv / MP / '18, Dartmouth Coll, 11, mathn
Swift, Charles J / physicist, NBS / MP, physical problems on comps / '18, Purdue U (U Pa; PhD), 1, -
Taussky, Olga / expert mathn, NBS / MP / -, U Cambridge, Eng (PhD), 9, mathn
Temme, Donald H / -, Hq, USAF, Comptroller / EP / '28, U Nebr, 1, maint engr
Todd, John / chf, Compn Lab, NBS / MP / '11, Cambridge, Eng, 10, -
Trimble, George R, Jr / sr mathn, Techl Compg Bur, IBM / AMP / '29, U of Del, 3, mathn
Wetrogan, Nathan / mathn, USN Hydrographic Ofc / MP / '28, -, 1, mathn
Wolf, Joseph Jay / res assoc, Logistics Res Proj, Geo Wash U / AMP, supply, datahandlg aplns / '28, Amer U (Geo Wash U), 3, -

VIRGINIA: Andrews, Thomas B, Jr / superv, NACA, Langley Fld / AMP / '23, U of Va, 7, mathn
Gleissner, Gene H / dep hd, Prgmg & Coding Branch, NPG, Dahlgren / AMP / '28, Colum U, 2, mathn
Kozarsky, Karl / mathn, NPG, Dahlgren / AMP / '29, -, 1, -
Macchia, Michael / dep hd, Prgmg & Coding Branch, Aiken Relay Calc, NPG, Dahlgren / AMP / '24, Fordham U, 3, mathn
Niemann, Ralph A / hd, Prgmg & Coding Branch, Compns & Ballistic Dept, NPG, Dahlgren / ABEMP / '19, U Ill, 6, mathn
Perry, David P / mathn, ERA, Arlington / AMSP, log des / '23, U Pa (Moore Sch), 4, mathn
Stoller, M J / aero res sci, NACA, Langley Fld / ADP / '17, U Va, 4, elec engr
Welchman, W Gordon / dir comp aplns, Engrg Res Assoc, Arlington / AMP, sys log of comps / '06, Cambridge U (Eng), 12, mathn

WEST VIRGINIA -- None

NORTH CAROLINA: Joiner, Raymond L / tab proj planner, Natl Weather Records Center, Asheville / AP, weather stat analysis / '15, Geo Wash U, 5, -
Whittlesey, John R B / stud, Inst of Stat, Chapel Hill / AMP, aplns in psychology & quantum mechanics (phys) / '27, U of N C, 1, math statn

SOUTH CAROLINA, GEORGIA -- None

FLORIDA: Hare, Robert R Jr / mathn, Air Force Missile Test Center, Cocoa Beach / AMP / '25, Ind U (De Pauw U), 1, analyst in data reduction

OHIO: Albers, Lynn / mathn, Lewis Lab, NACA, Cleveland / AMP / '19, U Mich, 2, mathn
Belzer, Jack / dir compg lab, Battelle Memorial Inst, Columbus / AMP, astronomy / '10, Cath U, 12, mathn
Fluke, Carl S / chief coder, Flight Res Lab, Wright Patsn AFB / MP / '27, Wash & Jeff Coll, 4, mathn
Moshos, George J / physicist, NACA, Cleveland / DCAMP, controls / '23, U Mich, 4, -
Patton, Norman A / aero res scientist, NACA, Cleveland / AMP, IBM compg / '24, Carnegie Inst Tech, 3, mathn
Pierson, Robert L / spec rep, Product Dev Dept, Natl Cash Register, Dayton / ABEPS / '12, Brown U, 15, -
Ross, Clarence / -, USAF, Wright Patsn AFB / AMP / '06, U Wash (PhD), 6, mathn
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ILLINOIS: Clutterham, David R / grad res asst, U Ill, Urbana / DMP / '22, -, 3, mathn
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Eidem, Ralph H / dir, Elecnc Res, Ernst & Ernst, Chic / ABP / '13, Loyola U (Nwn Sch of Commerce) 9, consultant
Ketchum, P W / prof math, U Ill, Urbana / MP / '03, U Ill, 30, teaching
Lyon, Vergil E / assoc res dir, ACNielsen Co, Chic / ABP / '04, U Wisc, 2, statn
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Wilson, Ross B / prodn mngt, ACNielsen Co, Chic / ABP / '08, Oberlin Coll, 3, -

MICHIGAN: Bauer, Walter F / res mathn, WRRC, Ypsilanti / AMP / '24, U Mich (PhD), 2, -
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Benaglio, R Victor / engr, Bendix Res Labs, Detroit / DEMP / '24, U Ill, 3, elec engr
Benjamin, Kurt / statn & hd of Tab Serv, U Mich, Ann Arbor / AP, primarily IBM as apld to res in stat / '20, U Mich, 11, statn
Brown, James Harvey / res assoc, Dig Compn Grp, WRRC, Ypsilanti / ADMP, Midac coding / '22, U Mich, 4, prgmr
Denecke, Mildred Frances / res asst, WRRC, Ypsilanti / DEP, apld physics, engrg / '27, U Mich, 2, -
Duggar, Anderson, Jr / pres, Equitable Engrg Co, Detroit / ACDEMP / -, U Detroit, 0, engr & mathn
Conte, Samuel D / asst prof, Compn Lab, Wayne U, Detroit / AMP / '17, U Mich, 3, teacher
Cowles, E Devere / techn in mach meth, Detroit Edison Co, Detroit / ABCDEMP, pub utility billing / '04, -, 10, -
Graney, Edward P / res asst, WRRC, U Mich, Ypsilanti / DMP / '29, Notre Dame, 1, -
Hope, Lawrence F / asst hd, Res Labs Div, Gen Motors Corp, Detroit / ABCDMP, infm searchg / '09, Yale, 5, res engr
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Lemelin, Roger J / res asst, WRRC, Ypsilanti / '27, Bowling Green State U, 1, res

Ligon, Albert L / compg engr, Parsons Corp, Aircraft Div Traverse City / AMP, IBM mach for engrg problems in rotor blade design / '21, -, 5, -
Pollmar, Carl H / res assoc, Engrg Res Inst, U Mich, Ann Arbor / BDMP / '16, U Mich, mathn
Roggenbuck, Robert A / superv of engine anal, Engrg Res Dept, Ford Motor Co, Dearborn / ABDEMP / '16, Lawrence Inst Tech, 5, res engr
Rubenstein, Mrs Mollie A / none / AMP / '24, Colum U Grad Sch (MA '47), 3, statn
Summerhays, J E / res assoc, WRRC, Ypsilanti / ADP / '28, U Mich, -, sys analyst
Wright, Jesse B / res mathn, Engrg Res Inst, U Mich, Ann Arbor / BDMP / 20, U Mich, 3, mathn
Wyman, Irma M / res assoc, Dig Compn Grp, WRRC, Ypsilanti / ADMP / '28, U Mich (Coll Engrg), 4, prgrmr

WISCONSIN: Ford, Samuel J / meth analyst, Allis-Chalmers Mfg Co, Milwaukee / ABDEP / '15, La Salle, 16, acct
Hammer, Preston C / dir, Numer Anal Lab ; & assoc prof math, U Wisc, Madison / AMP, res / '13, Ohio State U, 5, admv scientist

MINNESOTA: Cohen, Arnold A / dir, Sys Dev, Engrg Res Assoc, St. Paul / ACDEMP / '14, U Minn, 6, engr
Field, William J / sr engr, Engrg Res Assoc, St Paul / ADEMP, components / '06, U Minn, 5, engr
Lode, Tenny / dir res, Minn Elecncs Corp, St Paul / ADEMP / -, U Minn, 3, mathn

IOWA: Goheen, Harry Earl / assoc prof, Iowa State Coll, Ames / AMP, teaching / -, Stanford (PhD '40), 6, prof
Lang, Kermit / asst acty, Equit Life Ins Co of Iowa, Des Moines / ABMP / '13, State U Iowa, 4, acty

MISSOURI, NORTH & SOUTH DAKOTA, NEBRASKA, KANSAS, KENTUCKY -- None

TENNESSEE: Arnette, Mary Ruth / assoc mathn, Math Panel, Oak Ridge Natl Lab, Oak Ridge / AMP, coding IBM, SEAC, Oracle / '15, U Tenn, 3, prgmr
Drucker, B M / grad fellow, Oak Ridge Inst of Nuclear Studies, Oak Ridge / MP / '19, U of NC, 2, grad stud
Goertzel, Herbert / jr mathn, Oak Ridge Natl Lab, Oak Ridge / AMP / '30, U Tenn, 3, mathn
Hodges, Arlice Houston, Jr / hd data red grp, ARO, Tullahoma / AP, wind tunnel instrmn / '23, Tenn Poly Inst, 3, -
Householder, Alston S / -, Mathematics Panel, Oak Ridge Natl Lab, Oak Ridge / MP / -, -, 3, mathn
Johnson, Phyllis C / mathn, Carbide & Carbon Chem Corp, Y-12, Oak Ridge / ABMP / -, U Wash, 5, compr
Kelly, J P / hd, Numer Anal Lab, Carbide & Carbon Chem Co, Oak Ridge / AMP / '24, ORINS, 5, mathn
Morel, T R / engr, ARO, Manchester? / EMP, Maddida operator & maint / '28, MIT, 1, -
Moshman, Jack / sr statn, Oak Ridge Natl Lab, Oak Ridge / AMP, stat / -, U Tenn. 4, statn

ALABAMA, MISSISSIPPI, ARKANSAS, LOUISIANA -- None

OKLAHOMA: Bonner, Robert N / res mathn, & hd, CPC Grp, Carter Oil Co, Tulsa / AP/ '17, U Wisc, 4, -
Fullerton, Paul W / rep, Apld Sci Dept, IBM, Tulsa / AMPS, engrg / '23, Calif Inst Tech, 2, engr
Marble, Richard A / none / MP / '24, Harv, 3, teacher

TEXAS: Steward, James G / mathn, Dept of Med Stat, Sch of Aviation Medicine, Randolph Field / AMP, record keeping / '23, Kans State Coll, 3, mathn

MONTANA, IDAHO, WYOMING, COLORADO — None

NEW MEXICO: Benson, A I / staff mem, Los Alamos Sci Lab, Los Alamos / AMP / '16, U Wisc (MS math) 3, apld mathn

Bouricius, Willard G / staff mem, Los Alamos Sci Lab, Los Alamos / AMP, theoretical physics / '20, Yale (PhD '49), 10, physicist

Gardner, Earl B / superv, automatic compn Unit, Land-Air, Inc, Alamogordo / AMP / '16, MIT (MA Mont State U), 10, mathn

Graham, Alice L / mathn, White Sands Pvg Grd, Las Cruces / P / '11, Kans State Coll, 4, mathn & prgmr

Lane, William H / compn analyst, IBM Compns, Los Alamos Sci Lab, Los Alamos / AP, mathl compn, procedures design / '20, CCNY, 11, analyst

ARIZONA, UTAH, NEVADA, WASHINGTON, OREGON — None

CALIFORNIA: Adamson, P A / engr, Hughes Aircraft Co, Culver City / ABCDEMP / '25, Calif Inst Tech, 3, engr

Armer, Paul / actg chf, Numer Anal Dept, Rand Corp, Santa Monica / ABMP / '24, UCLA, 6, mathn

Baker, Richard H / chf engr, Dig Contr Sys, La Jolla / ACDEP / '21, LA City Coll, 10, comp sys des engr

Bergman, Stefan / prof, Stanford U, Stanford / AEMP, mathl tables / -, -, 15, prof math

Curtiss, John H / -, NBS, Los Angeles / ACDMP / -, Harv (PhD '35), 7, sci admr

Dethlefsen, Douglas G / techl engr, IBM Engrg Lab, San Jose / ADEMP, data handlg / '23, Cal Tech (Johns Hopkins, Stanford), 1, elec engr

Dufford, D E / -, Analysis Div, NAMTC, Pt Mugu / ADEMP / '23, Harv, 6, -

Eaton, M L / mathn, NAMTC, Pt Mugu / ABMP, statl aplns / '09, UCLA, 2, mathn

Englander, Herman S / supvg mathn, US Navy Elecncs Lab, San Diego / AMP / '16, Calif Inst Tech, 2, mathn

Faulkner, Frank D / assoc prof, USN Post-Grad Sch, Monterey / AMP / '15, -, 3, instructor

Holmes, Donald / hd, IBM Compn Lab, Shell Dev Co, Oakland / ABMP / '18, U Pgh (Nwn U, MS), 1, chem engr

Lipkis, Mrs Roselyn S / mathn (on leave), Inst for Numer Anal, Los Angeles / AMP / '21, Oberlin, 10, prgmr

Luxenberg, Harold / mem techl staff, Computer Sys, Hughes Res & Dev Labs, Culver City / DP / '21, UCLA (PhD), 3, mathn & prgmr

McKay, Angus R / res engr, No Amer Aviation, Downey / ACDMP / '28, U Cal (Berkeley), 2, mathn

Melahn, Wesley S / mathn, Rand Corp, Santa Monica / AEMP / '23, Harv, 4, -

Meisling, Torben / asst prof, U Calif, Berkeley / ACDEMP / '23, U Calif (PhD), 3, -

Mendelson, Myron J / staff engr, Northrop Aircraft, Los Angeles / ADMP / '25, UCLA, 3, -

Mugele, Raymond A / engr, Shell Dev Co, Oakland / AMP, chem engrg / '14, U Calif, 4, engr

Ohlinger, L A / dir of compg, Northrop Aircraft, Los Angeles / ACDMP / '07, Armour Tech, 3, admr

Pendery, D W / adm asst, IBM Los Angeles / APS / '24, Stanford U, 4, -

Soroka, Walter W / prof, Div Engrg Des, U Calif, Berkeley / ACDP / '08, MIT, 12, mechl engr

Srull, Donald W / res engr, Consol Vultee, San Diego / AMP / '29, U Mich, 2, res engr

Stevens, Louis D / proj engr, IBM Engrg Lab, San Jose / ACDEP / '25, U Calif (Berkeley), 4, dev engr

Southard, Thomas H / mathn, Inst for Numer Anal, Los Angeles / AMP / '11, Ohio State U, 1, -

Teichroew, D / res statn, Inst for Numer Anal, Los Angeles / AMP / '25, U of NC, 2, statn
Tillitt, Harley E / hd, Compg Br, Nav Ord Test Sta, China Lake / MP / '16, Claremont Grad Sch, 7, mathn
Tupac, James D / mathn, NAMTC, Pt Mugu / ADMP / '27, U Minn, 1, mathn
Wickett, Walton A / res engr, Friden Calcg Mach Co, San Leandro / ABMP, semi conductors / '14, Harv Coll Engrg, 2, engr

CANADA: Aitchison, J H / rep, Apld Sci Dept, IBM, Toronto / ABEMP / '28, U Toronto, 2, engr
Chung, James H / hd, Math Sec, Compn Centre, U Toronto / AMP / '24, U Toronto (PhD), 2, mathn & prgmr
Glinski, G / dir of dev, Compg Devices of Canada, Ltd, Ottawa / ABDEMP / '12, Warsaw Sch of Tech (Poland), 5, dipl engr (elec)
Gotlieb, C C / actg dir, U Toronto Compn Centre / MP / '21, U Toronto (PhD), 5, prof
Griffith, B A / assoc prof, Dept Math, U Toronto / MP / '08, U Toronto, 6, prof
Hume, James N P / asst prof, Dept Physics, U Toronto / MP, theoretical physics / '23, U Toronto, 1, U prof
Wood, L R / res engr, Ferranti Electric, Ltd, Mt Dennis, Ont / DEMP / '22, U Toronto, 3, engr
Worsley, Beatrice H / staff mathn, Compn Centre, U Toronto / MP / –, Cambridge U (Eng), 5, mathn

Key to Some of the Abbreviations

acty	actuary	MIT	Mass. Inst. of Technology
APG	Aberdeen Proving Ground	Met	Metropolitan
apld	applied	Mut	Mutual
apln	application	NACA	National Advisory Comm. for Aeronautics
BRL	Ballistics Research Laboratory		
Camb	Cambridge	NAML	Natl. Apld. Math. Lab.
comm	committee	NAMTC	Naval Air Missile Test Center
comp	computer	NBS	National Bureau of Standards
compg	computing	NPG	Naval Proving Ground
compn	computation	Nwn	Northwestern
contr	control	ord	ordnance
cust	customer	prgm	program
dem	demands	prgmr	programmer
dig	digital	res	research
elec	electric	sys	system, systems
elecnc	electronic	tech	technology
instrm	instrument	techn	technician
instrmn	instrumentation	techl	technical
log	logic, logical	USAF	U.S. Air Force
		WRRC	Willow Run Research Center
CPC	Card Programmed Calculator	ORINS	Oak Ridge Inst. for Nuclear Studies

WHAT COMPUTERS DO

by S. B. Williams, President, Association for Computing Machinery, as told to E. C. Berkeley

Three large organizations now express active interest in the field of computing machinery: the American Institute of Electrical Engineers, the Institute of Radio Engineers, and the Association for Computing Machinery. The AIEE organizes meetings and lecture seminars, publishes papers, and has a committee on computing machinery. The IRE organizes sessions and lectures, publishes papers, and has a Professional Group on Computers. The ACM organizes meetings and publishes papers on computing machinery. Overlap? Duplication? Confusion?

Part of the overlap and duplication is beginning to be avoided through the activities of the Joint Computer Conference Committee, which is made up of representatives of all three organizations. This committee has held joint meetings (Philadelphia, 1951, and New York, 1952) and is publishing proceedings separate from the proceedings of the parent bodies. A third meeting will be held in Los Angeles in February, 1953 (the Joint AIEE-IRE-ACM Western Computer Conference, Hotel Statler, Feb. 4, 5, 6).

But some more of the overlap and duplication may be avoided, by allocating portions of the field of computing machinery according to main interest. As between the ACM and the other two organizations, there is one area which is preeminently the area of the ACM: "What Computers Do". This includes programming, logical design, problems to be solved, numerical and logical analysis of scientific and business problems, etc.

As to the division of the field between AIEE and IRE, probably the division will be worked out in much the same way as the division has been worked out in the past: electronic, high frequency, communication, to the IRE; electrical, low frequency, power, to the AIEE.

"What Computers Do" is naturally a basic concern of the Association for Computing Machinery. Formed in 1947, the purpose of the ACM is

> "to advance the science, design, development, construction, and application of modern machinery for performing operations in mathematics, logic, statistics, and kindred fields, and to promote the free interchange of information about such machinery in the best scientific tradition."

It is a source of satisfaction to all members of the ACM that in five years the Association has acquired an international membership of 1300 members, still with the low dues rate of $2 a year, and still open to all persons who are "interested in and capable of forwarding the purpose of the Association."

As a result of the gradual allocation of interests among the three large organizations, we can look forward to a time when the technical papers on machinery are mainly to be found in the meetings and publications of the AIEE or the IRE, and information about "what computers do" is mainly to be found in the meetings and publications of the ACM.

(Note: Mr. Williams emphasizes that these are his personal views, and are not necessarily the views of any organization with which he may be associated.)

THE PARAMETERS OF A BUSINESS PROBLEM IN READING

by C. H. Dent, Hardware Mutuals

There is no doubt that engineers of computing machinery would be helped if business would state some of its problems. But I am sure that not many people in business are able to understand the technical language of the computer field. In fact, there is a dearth of information on the application of computing machinery to business. Many of us in business have so little conception of what this new equipment will do and how it works that we hesitate to come forth with some of our problems although they might possibly be suitable for discussion. We would like for computer engineers to prepare something in nontechnical language, which would describe the various types of computers and input and output devices, and how they operate.

In our own business, we believe that long-range research and planning in the areas of procedures and equipment are essential if we are to get the benefits of development in electronic and similar devices. While our company is not among the very large fire and casualty insurance companies, neither can it be considered a small one. We wrote over $65 million in premiums in 1952, and we give service to a half million policyholders through 39 offices located in all parts of the United States. We believe we are large enough to start planning for the use of electronic equipment beyond our present punched card equipment, and we realize that its use probably will mean a radically different way of handling our clerical work.

An example of a problem where we should like to see electronic reading devices used is our problem of preparing input for machinery from handwritten or typewritten records. At the present time, we prepare, by clerically operated key-punch machines, several million punch cards each year, in order to accumulate figures for internal and external reports and for rate-making purposes. In Figure 1 appears the record from which these separate cards (A, B, C) are punched for new and renewal Automobile business. This record is the "Statistical" copy of the policy.

As may be seen, the copy of the policy contains about two dozen items of information. Most of the E items are coded and expressed as correspondingly numbered F and G items. One or more of three cards are punched according to the scheme described in Table 1.

The policy copies come to our Home Office Statistical Department daily from our 13 processing offices. They are in groups accompanied by control tapes for each group. We process about 500,000 auto sheets per year, from which Card A is punched. About 350,000 of these also require Card B, and about 50,000 also require Card C. There are perhaps 20,000 cases which require only Card B, or Cards B and C. In addition to auto insurance, we write a number of other lines, both fire and casualty, but we have confined the illustration to the one line to avoid confusion.

The question of course is: is there any way in which electronic reading equipment can be made to read these policy copies and actuate card punching equipment, thus eliminating or reducing manual punching and verifying? We realize that it probably would be necessary for us to redesign the policy form or card. This could easily be done within reasonable limits. We shall be glad to furnish any additional information that may be needed.

(D2) NEW BUS.

AUTOMOBILE POLICY (Combination Form) — POLICY No. 234567 (D1)

Figure 1

DECLARATIONS

NON-ASSESSABLE POLICY

Item 1	Name of Insured: GEORGE A BLACKMAN	Occupation of the named insured is: ATTORNEY
	Address: (No., Street) 2556 NORTH 10TH STREET	The automobile will be garaged principally in the town, county, and state shown at left, unless otherwise stated herein:
	(Town, Zone, County) MADISON 5 (E4) — DANE 232 (E3) (Code) — (State) WISCONSIN (E2) — (Code) 96 (E5)	
Item 2	Policy Period: From: DECEMBER 1, 1952 (E1) To: DECEMBER 1, 1953	12:01 A. M., standard time at the address of the named insured as stated herein.

Item 3 The insurance afforded is only with respect to such and so many of the following coverages as are indicated by specific premium charge or charges. The limit of the company's liability against each such coverage shall be as stated herein, subject to all the terms of this policy having reference thereto.

COVERAGES	LIMITS OF LIABILITY	PREMIUMS
A. Bodily Injury Liability.	$ 5,000 Each Person. $ 10,000 Each Accident. (E7)	$ 35.00
B. Property Damage Liability.	$ 5,000 Each Accident.	$ 15.00
C. Collision or Upset.	Actual Cash Value Less $ 50 Deductible. (E8)	$ 25.50
E. 80% Collision or Upset.	Actual Cash Value Less 20% of First $250.	$
J. Towing and Labor Costs.	$10 For Each Disablement. (E9)	$ 5.00
K. Medical Payments.	$ Each Person	$
Y. Comprehensive. (includes fire, theft, windstorm, and other damage to the automobile, except by collision or upset)	Actual Cash Value. (E10)	$ 8.00
	TOTAL PREMIUM FOR THIS POLICY	$ 88.50
	DIVIDEND CREDIT ON PREVIOUS POLICY	$ 18.50 (E13)
Form Numbers of Endorsements Attached to Policy at Time of Issuance: 1016	NET	$ 70.00

Item 4 Description and use of the automobile and facts respecting its purchase by the named insured:

Model Year	Trade Name and Model	Classification	Body Type; Truck Size; or Tank Gallonage, Truck Load, or Bus Seating Capacity
1952	BUICK	-1 (E6)	SED

Serial Number	Motor Number	List Price	Number of Cylinders
785432	3579321	H-1 (E11)	

Month and Year Purchased by Insured	New	Used	Actual cost to Insured including equipment	The purposes for which the automobile is to be used are:
				☐ Commercial ☒ Pleasure and Business (E12)

STATISTICAL DATA THIS SPACE SHOWS "X" WHEN VEHICLE IS ENCUMBERED: ☐

Pol. No.	Eff. Date Mo.	Eff. Date Yr.	Expir. Date Term	Expir. Date Mo.	Expir. Date Yr.	St.	County	Terr.		Terr	Line Maj.	Line Min.	Form	Size	Class	Lim. BI	Lim. PD	A.R.	M.P.	Sp.	Exposure
SEE CAPTION	12	2 (F1)	1	12	3	48 (F2)	232 (F3)	940 (F4)	BI-PD	96 (F5)	10	1	X	X	1000 (F6)	0	0 (F7)	X	X	X	(G1) 12
												(G8)	Coll Cov	Form	Class	Age	M.V. Cov.		Sp.	Enc	
									COLL.-M.V.	21 (G4)	15	1	72 / 41 (G9)	1 (G10)	135 (G11)	1	01 (G10)		X	1 (G12)	X

Table 1

Card Columns in Punch Cards			
Card A	Card B	Card C	Information Punched
1-11	1-11	1-11	Constant information for each card in a group of work, expressing control data accompanying the group.
12	12	12	Item D2
13-18	13-18	13-18	Item D1
19-34	19-34	19-34	Items F1, F2, F3, F4
35-57	—	—	Items F5, F6, F7
—	35-57	—	Items G1, G4, G8, G10, G11, G12
—	—	35-57	Same as card B except G8 is replaced by G9
58-72	—	—	Premiums for the two items E7
—	58-65	—	Premium for item E8
—	—	58-65	Premiums for item E9
—	66-72	—	Premiums for item E10
73-79	—	—	Item E13
80	80	80	"0" in all cards

1. Meetings. From Sibyl M. Rock, Pasadena, Calif., to us:

We have subscribed to your magazine "The Computing Machinery Field" and find it very useful.

I have one suggestion, which you have probably already considered: Would it be possible for you to include a calendar covering, say the following four to six months, which would list the technical meetings of interest to those in the computer field?

At the present time, of course, such listings can be obtained from I.R.E. publications and the like. However, there are a large number of people in the computing machinery field who are not interested primarily in the electronic aspects and hence do not belong to the I.R.E. It seems rather unhappy from the viewpoint of such people to have the major activity for the computer group in the I.R.E. itself.

I have one other comment which is purely a personal reaction, that is, that there are too many meetings at the present time on the subject. In other fields such as chemistry and physics this same problem has been met by having one large annual meeting and smaller regional meetings. It's rapidly approaching the place where it is impossible to attend even the major meetings which are being offered. The field is becoming very large and a strong organization is much to be desired.

THE CMF will seek to publish, starting in the March issue, a list of forthcoming meetings. — Many people in the field agree with Miss Rock that there are too many meetings. -- More discussion or suggestions?

* * *

2. A Question of Spelling. From Harold Hotelling, Univ. of North Carolina, N.C. to Nathaniel Rochester, Engineering Laboratory, IBM, Poughkeepsie, N.Y. (with copy to THE CMF):

In the October issue of "The Computing Machinery Field", there is an invitation to send you any comments on nomenclature in this field.

Both the spellings "computers" and "computors" occur on different pages of this Journal, and I think also in other recent writings on the subject. Only the first has sanction of the Webster New International Dictionary, and the spelling with an "o" contradicts also all usage known to me prior to the last year. I urge that your committee try to put a stop to the frequent misspelling of the word in current publications.

Personally we prefer "computer". But we are currently trying to learn to write "analog" instead of "analogue", "Eniac" instead of "ENIAC", etc. In the matter of English spelling, the direction of progress, it seems to us, is to permit variant spellings, like "instalment" and "installment". Certainly, it will be easier for a future automatic computer to spell English if some of the leeway in spelling common two centuries ago is regained.

* * *

3. A Fair Price for a Magazine. From David R. Brown, South Lincoln, Mass., on Dec. 12, to us:

I am returning your publication, "The Computing Machinery Field." I very much enjoyed reading it. However, considering the American Scientist still costs only $1.50 per year, I think that the subscription price of $3.50 for "The Computing Machinery Field" is excessive and am returning the copy which you sent to me.

Our reply, on Dec. 20:

Thank you for your frank letter. The problem of what a magazine should cost is an important one. We agree with you that $3.50 a year for a quarterly like ours seems high; but we have no financing, no free labor, a small circulation now about 550, and not many ads (price range $15 to $55 in October, depending on size of company). If you work out the arithmetic of income and outgo, you can see that we are publishing this primarily as a service to people interested in computing machinery. If you could show us how to increase the number of subscribers and lower the subscription rate, we should be glad.

Footnote, Jan. 1: Circulation now: just over 600. Decision: publish six times a year instead of quarterly, at no increase in subscription rate. Hope: more people will consider THE CMF a good value.

* * *

4. Noted With Appreciation. From C.R. Pippenger, New York:

I think your magazine, THE COMPUTING MACHINERY FIELD, will be very useful. I hope you are getting adequate support for its publication.

From John M. Alden, Brockton, Mass.:

Have just received my copy of Volume 1, No. 4, of The Computing Machinery Field. Glad to see the expanded format. Feel that though your publication is small at the present time, it can be tremendously important.

AUTOMATIC COMPUTERS ON ELECTION NIGHT

by Eugene F. Murphy and Edmund C. Berkeley

On November 4, two automatic computers made their appearance on television for the purpose of computing political trends: Univac (Remington-Rand Eckert-Mauchly), on Columbia Broadcasting System TV, and Monrobot (Monroe Calculating Machine Co.) on National Broadcasting System TV.

In the case of Univac, the main part of the problem assigned early in October was to be ready each hour to estimate the number of states to be carried by each candidate, the total electoral vote, and the total popular vote. Starting October 7, a group was formed consisting of Dr. Max A. Woodbury, professor of statistics at the University of Pennsylvania, Dr. Herbert F. Mitchell, Jr., Director of Univac Applications, Remington-Rand, and a couple of programmers "parttime". Several mathematical methods were tried using early election returns of previous years, and were found lacking; finally one was chosen. As the deadline approached, the group included 8 comptometer operators, and 6 programmers, and everyone was putting in a work week of 60 to 120 hours. The final program was checked out in the early evening of November 4.

At 9:15 on election night, Univac calculated the first complete set of predictions. The automatic printer typed out the following:

.... UNIVAC PREDICTS -- WITH 3,398,745 VOTES IN --

	STEVENSON	EISENHOWER
STATES	5	43
ELECTORAL	93	438
POPULAR	18,986,436	32,915,049

THE CHANCES ARE NOW 00 TO 1 IN FAVOR OF THE ELECTION OF EISENHOWER

The men around the machine, many of them worn out with the hectic preparation of the preceding week, could not bring themselves to believe the result, contrary as it was to a great many predictions. So they agreed to change the "national trend factor" that the machine had computed from "40% shift to the Republicans" applying to a certain part of the vote, to 4%, and required the machine to recompute.

At 9:54, the prediction of the electoral votes using the arbitrary 4% trend factor was made: Stevenson 263, Eisenhower 268; and this was released over television. Shortly afterwards, it became clear that the 40% trend factor was much closer to the truth. At 10:32, using the 40% factor, Univac predicted Stevenson 155, Eisenhower 376, and General Draper of Remington-Rand spoke on TV to "explain". And not long afterwards, Stevenson conceded.

On November 13, after the smoke had cleared, Univac was run once again on the election prediction program. The results were:

Time	Stevenson	Eisenhower
9:15	93	438
9:54	103	428
10:32	155	376
11:10	159	372
11:45	172	359
12:45	119	412

For more information about the prediction formulas used, and more of the story of what happened, see a forthcoming paper "How Univac Predicted the Election" by Max A. Woodbury and Herbert F. Mitchell, Jr.

A Monrobot electronic calculator was rolled into the NBC television studio in Radio City, New York, and was assisted by a number of Monroe mechanical calculators to prepare data for it. The Monrobot was used primarily to compute the odds favoring a candidate in each state. Each calculation was made taking into account the distribution of votes already reported, the number of voters still to be heard from, the trend of votes as shown by partial returns, corresponding data in previous elections, and the uniform or nonuniform behavior of the particular state's voting record.

The general public certainly became more aware of electronic computing machery in one night than ordinarily would happen in several years of usual development and advertising. Here was first-class evidence of what automatic machinery for handling information could do. Here was evidence of the vast amount of work in preparing a program, and once the program was in the machine correctly, evidence of how important it was to keep human beings from tampering with the program. Here was evidence of the troubles of dealing with inaccurate, unchecked data. And finally, here was an audience of millions to notice oversights and mistakes.

MANUSCRIPTS FOR "THE COMPUTING MACHINERY FIELD"

We desire to publish articles that are factual, useful, understandable, short, and widely interesting to many kinds of computer people. An article may certainly be controversial if discussed reasonably. Sample subjects: Applications of Information-Handling Machinery to the Mail Order Business; What Information Theory is; Machine Translation; the Nature of Thinking; More Communication among Computer People; Automation in Oil Refining; etc.

In most cases, the length should be 1000 to 1500 words, and payment will be $10 on acceptance. Any manuscript submitted should be typed and should be accompanied by return postage; to be considered for the March issue, the manuscript should be in our hands by Feb. 20.

BOOKS AND OTHER PUBLICATIONS
(List 2: THE COMPUTING MACHINERY FIELD, vol. 2, no. 1, January, 1953)

This is a list of books, articles, periodicals, and other publications which have a significant relation to the computing machinery field and which have come to our attention. The main purpose of this list is to report the existence of information, because finding out that something exists is nearly always the hardest thing to find out. We hope this list may make it easier to keep up to date in the field of computing machinery. If you write to a publisher or issuer, we would appreciate your mentioning the listing in THE COMPUTING MACHINERY FIELD.

We shall be glad to report other information in future lists, if a review copy is sent or loaned to THE COMPUTING MACHINERY FIELD. Please do not mail a copy on loan without inquiring to see if we already have the book.

The general plan of each entry is: author or editor / title / publisher or issuer / date, publication process, number of pages, price or its equivalent / a few comments. It is not planned to repeat entries in later issues of THE COMPUTING MACHINERY FIELD except where corrections or changes are involved.

1. Ashby, W. Ross / Design for a Brain / John Wiley and Sons, New York (SEE their advertisement in this issue) / 1952, printed (in England), 260 pp, $6
   A profoundly important book, yet lucid even if not easy, and full of examples. Discusses basically how a machine equipped with a great many on-off circuit elements that have at first mostly random connections can program itself for survival. The author is the inventor of the Homeostat and the Director of Research at Barnwood House, Gloucester, England.

2. Diebold, John / Automation, The Advent of the Automatic Factory / D. Van Nostrand Co., New York / 1952, printed, 181 pp, $3
   Contains many ideas and a lot of information, and is not technical. Some of his points are arguable. The book is an outgrowth of a report "Making the Automatic Factory a Reality" by a research group of students at Harvard Business School.

3. Flood, M.M., editor, and others / Research Memorandum 709, "Report of a Seminar on Organization Science" / The Rand Corp., 1500 Fourth St., Santa Monica, Calif. Oct. 29, 1951, ozalid, 55 pp, limited distribution
   Contains eight papers by A.S. Householder, S.C. Kleene, Oskar Morgenstern, and other experts bearing on mathematical models for interaction in societies of human beings and societies of automata.

4. Institute of Applied Logic, staff of / The Journal of Computing Systems / The Institute of Applied Logic, 45 West Water St., St. Paul 1, Minn. / published quarterly, photooffset, about 55 pp, $5 a year
   The first issue, June 1, 1952, contains three papers on: computing machinery foundations; a"universal decision element"; and an abstruse subject in advanced symbolic logic.

5. Society of Actuaries' Committee on New Recording Means and Computing Devices / Report of the Committee, September 1952 / Society of Actuaries, 208 So. Lasalle St., Chicago, Ill. / 1952, printed, 107 pp. $1.50
   Contains the report given by M.E. Davis, J.J. Finelli and others at a meeting at the Hotel Commodore, New York, on Sept. 25, on how and where automatic electronic computers can be used in a large life insurance company. Solid, factual information; carefully weighed opinions.

The purpose of THE COMPUTING MACHINERY FIELD is to be factual, useful, and understandable. For this purpose the kind of advertising we desire to publish is the kind that answers questions, such as: What are your products? What are your services? And for each product: What is it called? What does it do? How well does it work? What are its main specifications? Adjectives that express opinion are not desired. We reserve the right not to accept advertising that does not meet our standards.

Every advertisement in this issue, we believe, is factual. In several cases original copy has been changed by mutual agreement between the advertiser and us, so as to be factual and objective.

For these reasons, we think that the following advertising is likely to be worth reading. So far as we can tell, the statements made are reasonable, informative, and worth considering.

Following is the index to advertisements:

EAI's Dataplotter...

An Electronic System That Converts

Digital Data To An Analog Plot...

Here is a system that will save a great many man-hours and costs, and will insure accurate and clear presentation of data.

This new Dataplotter, designed and developed by Electronic Associates, Inc., will automatically plot a cartesian curve composed of incremental points or symbols from IBM card data at maximum machine reading speed.

It will accept data from other inputs — magnetic tape, keyboards, digital computers, etc.

It will retain at all times the basic accuracy of the digital system.

Here's what the Dataplotter system consists of:

Variplotter Model 205G
Digital-to-analog converter, Model 417
Data input keyboard

For further information, contact Electronic Associates, Inc., Long Branch, New Jersey. Telephone, Long Branch 6-1100. No obligation of course.

A *Complete* DATA-HANDLING PROGRAM

Consolidated Engineering's Data-Handling Program has three basic phases. The first features high data accuracy, medium speed. In the second, speed is paramount. The third answers the need for high speed in final data reduction and in general mathematical and engineering computations.

SADIC SYSTEMS

Designed for both research and industrial installations, SADIC systems convert analog signals from strain gages, load cells, thermocouples, and similar devices directly into decimal digital form. High accuracy (1/10%) and sensitivity combined with a one-per-second samplingrate adapt it to a wide variety of applications. Digital output may be read out into punched cards, punched tapes, typewriters, etc.

Any desired number of SADIC channels may be combined. The above system contains 4 channels and readout devices.

MILLISADIC SYSTEMS

Featuring very high speed and medium precision, these systems sample analog data up to 1000 times per second and convert it to binary-coded decimal form with 0.2-0.3% accuracy. A typical application is digitizing signals from ground station equipment of telemetering systems for recording on magnetic tape or into computer memory systems. Systems can sample either a single phenomenon at a high rate or many different phenomena sequentially.

COMPUTER SYSTEMS

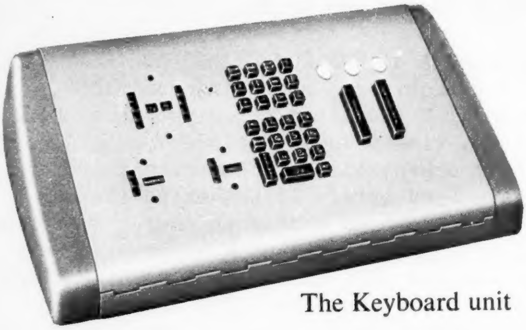
Computational speed is unusally high in the many possible systems assembled around the Model 30-201 Automatic Digital Computer. Operating on a binary-coded-decimal number system, the computer's magnetic-drum main memory stores 4000 words, plus 80 additional words in the "quick-access" memory. Number length is 10 decimal digits plus a sign designation. A single-address code is employed, with a total of 42 basic commands. Most operations are executed at rates of 500 per second. The Model 30-201 Computer is the central unit about which many computer systems can be designed. A wide variety of auxiliary input and output equipment, plus facilities for additional word storage, can be combined in systems adaptable to many scientific, engineering and statistical applications.

MONROBOT Electronic Calculator

for business and science . . .

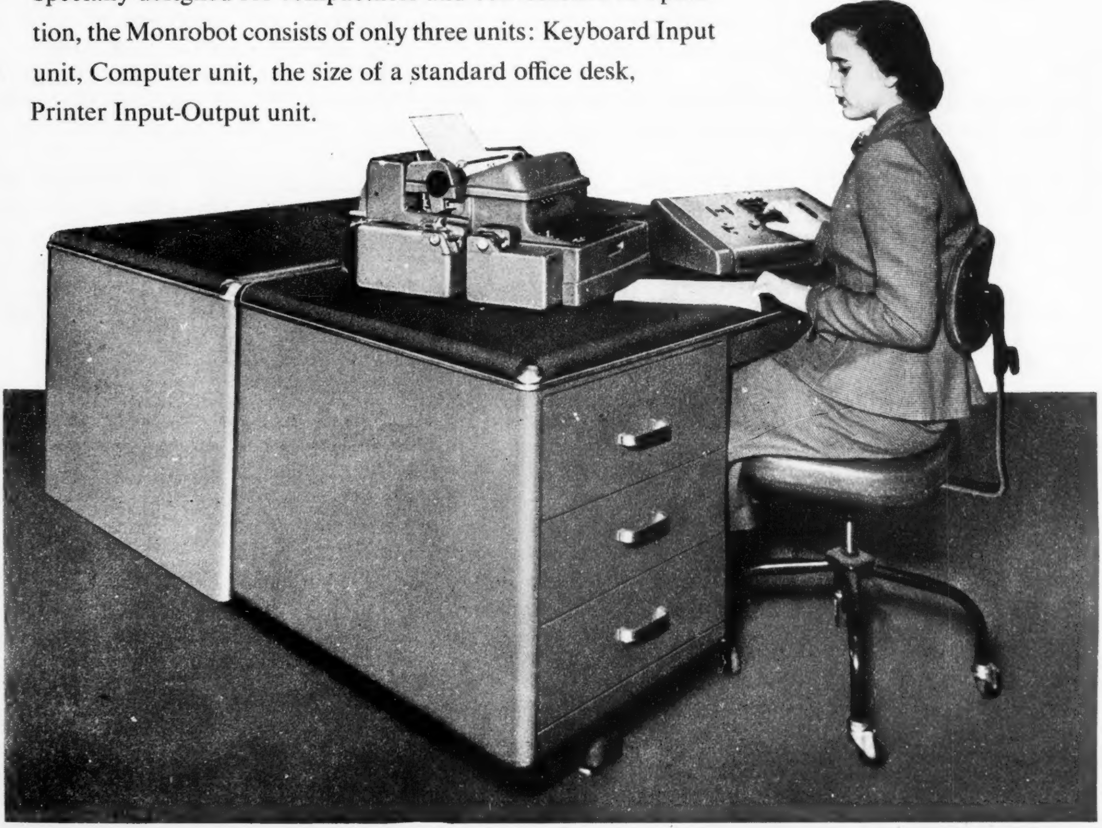
The ten basic operations performed by the Monrobot Electronic Calculator and their corresponding speeds are given below. These operating speeds include storage access time.

	OPERATIONS PER MINUTE
Addition	450
Subtraction	450
Multiplication	100
Division	100
Comparison	450
Modification	450
Stop	–
Print	10 digits per second
Print Stop	10 digits per second
Read Tape	10 characters per second



The Keyboard unit

Specially designed for compactness and convenience of operation, the Monrobot consists of only three units: Keyboard Input unit, Computer unit, the size of a standard office desk, Printer Input-Output unit.



Monroe Calculating Machine Company

Main Plant and General Offices
Orange, New Jersey

Memorandum from Edmund C. Berkeley and Associates
Publishers of THE COMPUTING MACHINERY FIELD
36 West 11 St., New York 11, N.Y.

January, 1953

THE COMPUTING MACHINERY FIELD -- ADVERTISING

1. What is "THE COMPUTING MACHINERY FIELD"? It is a bimonthly (formerly a quarterly) magazine, containing articles, reference information, and advertising, related to computing machinery, robots, automatic controllers, cybernetics, automation, etc. This issue is a sample. The main piece of reference information published is the "Roster of Organizations in the Field of Computing Machinery" (sample in this issue). The basic subscription rate is $3.50 a year. Single copies are $1.25.

2. Who are the logical readers? The logical readers of THE COMPUTING MACHINERY FIELD are the members of the Association for Computing Machinery, numbering some 1300, and probably another 2000 persons who are concerned with the field of computing machinery, etc. Many people are entering this field all the time. These include a great number of people who will make recommendations to their organizations about purchasing computing machinery and similar machinery. We have been carefully gathering the names and addresses of these people for some time and believe we can reach them. Since this is a new publication, we do not yet have a circulation breakdown. The print-order for the October, 1952, issue was 1000 copies, and the paid circulation as of Oct. 31 was about 400. The print-order for the January, 1953, issue was 1200 copies; the paid circulation on Dec. 31, 1952 was just over 600.

3. Information about products and services. The listings in the "Roster of Organizations" contain very brief statements about the chief products and services of each organization. It is a help to the reader of THE COMPUTING MACHINERY FIELD to give a good deal more information. It seems that the best and most reasonable way to provide this added information is through advertising, of a strictly factual character, printed in the magazine.

4. What type of advertising does THE COMPUTING MACHINERY FIELD take? The purpose of the magazine is to be factual and to the point. For this purpose the kind of advertising wanted is the kind that answers questions factually. See the introduction to the advertising in this issue, and the published advertisements as samples. We recommend, for the audience that we reach, that advertising be factual, useful, interesting, understandable, and new from issue to issue. We have had a number of comments expressing satisfaction with our style of advertising.

5. What is the cost of advertising? The next issue of THE COMPUTING MACHINERY FIELD will be in March, 1953. It will be on pages 8½" by 11" and will be produced by photooffset. Final copy for photooffset should if possible be prepared by the company advertising. It should be actual size, and it may include typing, writing, line drawings, printing, screened half-tones, etc. — any copy that may be photooffset without further preparation. Display advertising will be sold in units of full pages (ad size 7" by 10", basic rate $80) and horizontal half pages (ad size 7" by 5", basic rate $44). Classified advertising will be sold by the word (30 cents a word), with a minimum of ten words. The following discounts will apply to display advertising: 20% for a company with less than 100 employees; 40% for a company with less than 20 employees and for a publisher of books; 4% for payment in January; 2% for payment before closing date February 20. (Back cover: $150, no discounts.)

6. Changes and Improvements. If there continues to be wide response in subscriptions and advertising to THE COMPUTING MACHINERY FIELD, many possibilities will be opened up, including publishing of more articles, and more reference information, and perhaps printing instead of photooffset.

GAP/R

George A. Philbrick Researches, Inc.
230 Congress Street, Boston 10, Massachusetts

January, 1953

Attention: Each Reader of THE COMPUTING MACHINERY FIELD

Reference: Availability of Computing Machinery.

Dear Reader:

To show you in condensed fashion what we make and why, the two pages following are given over to selected excerpts from our current literature.

This company specialises in an exclusive type of automatic computor, classed as ANALOG, HIGH-SPEED, and ALL-ELECTRONIC. All our efforts since 1946 have been concentrated on this product; on its design, production, and application to the study and solution of a variety of problems. This equipment is being successfully employed to aid research and development in fields such as industrial controls, servomechanisms, propulsion regulation, hydro governing, vibrations, biochemistry, etc. It is well suited to the representation and study of nonlinear dynamics and other physical phenomena.

A complete series of standard computor components is offered, enabling direct assemblage of computing structures for the problems at hand. The components are available individually or in appropriate working assortments, and the building-block arrangement is considered to contribute to their flexibility and general usefulness.

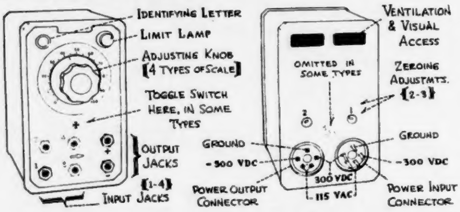
You are welcome to write for the general GAP/R Catalog & Manual, which describes our regular line of equipment and the techniques of its operation. Other documents include the first issue of "The Lightning Empiricist", devoted to lore on this brand of computing, as well as certain reprints, etc. Prices and quotations will be promptly supplied, and your questions on any score are invited.

Sincerely yours,

GEORGE A. PHILBRICK RESEARCHES, INC.

The K3 Series of Analog Computor Components

Each K3 Component is a self-contained operational unit, engineered for functional efficiency in a computing system. A special cast aluminum case houses each Component uniformly, compactly, and durably. At the back, 5-pin input and output connectors supply power, and permit cable connections in cascade from each Component to the next. On the front, one to four input jacks and two output jacks provide for computing signal connections via standard cables. The output jacks afford direct and inverted signals, and are usable simultaneously. An indicating dial on each Component serves for setting characteristics; and a lamp denotes limiting of the output signals.



GENERAL SPECIFICATIONS

Inputs (1-4)
- Range: 50 VDC plus and minus
- Impedance: Over 1 megohm
- Jacks: Grounding without plug

Outputs (2)
- Range: 50 VDC plus and minus
- Impedance: Under 300 ohms
- Jacks: Non-grounding

Power Requirements:
- 10-12 Milliamperes at 300 VDC
- 10-12 Milliamperes at −300 VDC
- 0.1-0.13 Amperes at 115 VAC

Amplifiers
- Direct Current, with various gains
- Rise-time: 2 microseconds, (unit gain)
- Utility Ampl. (alpha): 2 triodes
- Special Ampl. (beta): 4 triodes

Tube Complement (4-5)
- 4-5 12AX7
- 0-1 12AU7
- 1 NE-51 Limit Lamp

Performance
Checked by known responses, using standard signals and CRO.

Accuracy:
As indicated on page 3

Drift in DC Levels
0.5% per day, following warmup, on regulated AC.

Zeroing
Bimonthly, or when and if necessary, using slotted adjustments (2-3) at rear.

Case Dimensions
5¼ by 7¼ by 4¾ inches.
Four such cases will fit abreast between the channels of a standard rack. (Use Component Shelf Model HC).

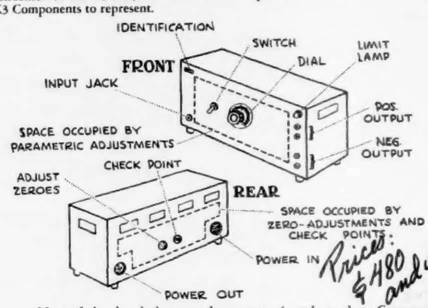
Finish:
Durable Black Wrinkle.

Weight:
5 pounds.

Prices: $200 to $250

The K4 Series of Analog Computor Components

These Components embody operations and functions which cannot be condensed to the K3 size, and which would require more than 4 interconnected K3 Components to represent.



Prices: $480 and up

Most of the descriptive remarks on page 4 apply to these Components also, though with the following exceptions. First the *width* is 4 times as great, very nearly; one unit fits on an HC Shelf rather than 4. Also there may be as many as 4 times the number of tubes, with correspondingly higher power consumption. Naturally, more parametric adjustments are possible. Since there is more room, the positive and negative output jacks are each supplied in paralleled pairs for multiple connections.

The width of 17 inches permits attachment of 1-inch angles at the front on each side, so that any K4 Component may be installed in place of a standard 7 by 19 inch rack panel.

GENERAL SPECIFICATIONS

Inputs
(2-4)
- Range: —50 to 50 VDC or —25 to 25 VDC
- Impedance: Above 1 Megohm

Outputs
(2-5)
- Range: —50 to 50 VDC
- Impedance: Below 300 Ohms

Power Requirements
- 20-60 Milliamperes at 300 VDC
- 20-50 Milliamperes at —300 VDC
- 0.13-0.38 Amperes at 115 VAC

Accuracy
See remarks on page 3.

Tube Complement
8-22 12AX7, 0-4 12AU7

Limit Lamp
NE-51

Input Jacks
Grounding on plug removal.

Output Jacks
Duplicate: non-grounding.

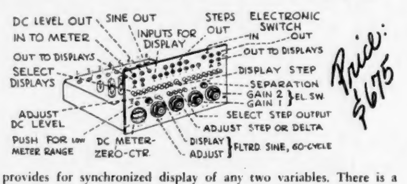
Case Dimensions
17 by 7 by 5¼ inches.

Finish: Durable Black.

Weight: 20 pounds.

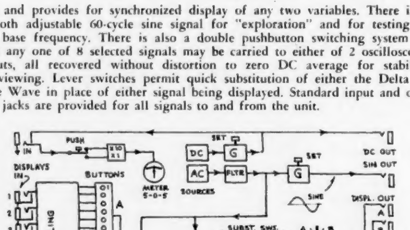
Central Component, Model CC

The Central Component combines several facilities and conveniences for successful operation of the Co nputor Components. Together with the Power Supply and one or more CRC s, it makes up a complete Computing System for whatever Computor Components are to be employed. This device supplies a calibrated and adjustable initiating signal (or *stimulus*) of special type, called the DELTA Wave, which is fed via push-buttons to four outputs. It has a DC metering system of dual sensitivity, which may be used for precise voltage measurement and for the provision of steady voltages for test or computation. It also has an accurate 30-cycle electronic switch, which preserves



Price: $675

DC and provides for synchronized display of any two variables. There is a smooth adjustable 60-cycle sine signal for "exploration" and for testing at the base frequency. There is also a double pushbutton switching system so that any one of 8 selected signals may be carried to either of 2 oscilloscope inputs, all recovered without distortion to zero DC average for stability of viewing. Lever switches permit quick substitution of either the Delta or Sine Wave in place of either signal being displayed. Standard input and output jacks are provided for all signals to and from the unit.



Basic Computor Assembly (CA)

One of the virtues of the GAP/R Component series is that a Computor may be acquired in easy stages. A modest first selection may be expanded to any desired extent with increasing complexity of problems to be solved, and as the user's familiarity grows.

A suggested assortment has been worked out which, while economical, provides ample capacity for a variety of problems. For example, differential equations of 4th order and lower may be solved. This assortment includes one Central Unit — the Relay-rack Assembly —, plus the following 12 Computor Components: 3 K3-A Adding Components, 5 K3-C Coefficient Components, 3 K3-J Integrating Components, and 1 K3-L Unit-lag Component. An appropriate selection of power and signal cables, with fittings, is also included.

Power Requirement: 115 V, 60 Cycles

Shipping Weight Cased: 390 pounds

SERVICES by GAP/R

It is of the highest interest to this organization to promote the successful application of its products, and of computing machinery in general, to problems in which they can serve progress most effectively. Thus a primary service is to advise on how a problem is best attacked: on what method or methods of those available should be chosen. If it appears that our method is best, (and the enquirer will apply a discount for local bias), then a subsequent service is to show how the problem is approached in terms of our equipment.

This generally involves assistance with equations (advanced ability in mathematics is maintained), reduction of these to block-diagram form, in many cases setting up and operating an appropriate Computing Assembly in our laboratory, and the solution of examples. No charge is made for this service, whether or not a sale of equipment results.

Frequently our engineers, in dealing confidentially with customer's problems, have been able to make very real contributions to developments in progress. As is desirable in this activity, a broad range of research experience is represented. Noteworthy is an established reputation in the field of automatic controls, mechanical, electrical, and fluid-operated, covering most of their diverse applications. And of course GAP/R has a strong position in electronics itself, in research techniques and facilities.

For handling overhaul and repair with economy and dispatch, GAP/R is amply equipped. On the rare occasions when necessary, Components are repaired or replaced within an average interval of one week.

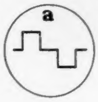
Every Component is guaranteed for 90 days against failure due to faulty parts or manufacture. After this period a nominal service charge may be made if equipment is returned to the laboratory for replacement or overhaul.

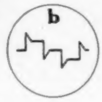
Oscilloscope Presentation Techniques

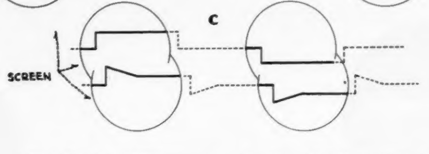
For the display of computed results in the high-speed type of analog, a cathode-ray oscilloscope (CRO) is essential. The most expensive instruments are not necessary, however; some very successful work has been done using the most modest possible CRO. Currently, the most popular choice happens to be the DuMont 304-H.

There is no need to discuss here the standard operating techniques which are well described in CRO instruction books, and which in fact are widely familiar among laboratory personnel. On the other hand, a few comments will be helpful on the operations required for applying the CRO as a displaying means for a high-speed Computor.

Generally a 60-cycle sweep, synchronized to the line frequency, is most useful for plotting. If the Delta Wave be plotted thus, and the gains adjusted to keep the whole trace visible, one obtains the pattern shown at (a). A possible *response* pattern, with the same CRO settings, is shown at (b). By increasing the horizontal gain, and shifting the horizontal position, one obtains the highly useful types of display shown at (c).







The calibration of CRO screens, say in volts per inch, is generally not adequately attained through the gain adjustments alone, for any but rough solutions. Thus it is recommended that a step of known size be fitted to a known vertical distance on the screen. With the same CRO gain adjustment, the excursions of any response switched on in place of the step may be determined by simple comparison. On the time axis, the horizontal (sweep) gain may be adjusted so that the 4-millisecond individual computing interval is fitted to a convenient known dimension on the screen. Then, provided the sweep is reasonably linear, a measure of fractional time during the response or solution is available. More accurate timing may be had by applying a periodic signal, say of 25 KC, either to the vertical input or as intensity-modulation. This will divide the computing interval into 100 equal parts.

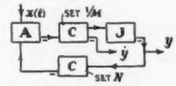
A very interesting technique, not as familiar as plotting against time by employing a sweep signal, is to plot one signal against another. This was referred to above in connection with cross-plotting to show geometrical characteristics. By plotting two computed signals against one another, *orbits* of operation are obtained in which time becomes only a parameter along the curves. In dynamics for example, the coordinates of displacement and velocity are called *phase-space*, and plots in this space — easily obtained in the high-speed analog without extra equipment — are useful typically in nonlinear work. In controls, specifically governors, plots of regulated versus manipulated variables are valuable in several ways; they are called Léauté Diagrams. More generally, the phase relations between variables are clearly seen in such plotting, as also are stability and the effects of discontinuities. Wherever this type of cross-plotting leads to confusion, one may quickly return to time-plots for each variable to keep the record straight. The technique has found favor in certain cases, however, since it provides information in such compact form.

Some Block Diagrams

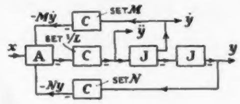
Block Diagrams, so-called, have become the accepted shorthand for dynamic systems, particularly as regards computors. They are equivalent to equations, with additional causal information, and provide a stepping-stone close to an analog computing structure and its Components. In setting up the Computor, if added realism is sought, the Components may be assembled and interconnected in a manner which resembles the block diagram.

One of the commonest physical situations is that covered by the equation:

$$M\frac{dy}{dt} + Ny = x(t)$$



This is directly set up with 4 Components as shown. Outputs of y and its derivative, among others, are available. (Note that negative Component outputs are employed wherever possible.) An equivalent assembly not giving the derivative is simply a K3-L Unit-lag Component in series with a K3-C Coefficient Component. The K3-L is set at M/N in appropriate units, and the K3-C is set at $1/N$. (Hereafter we may refer to a Component by its final initial alone.)

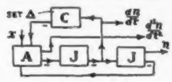


Going one notch beyond the above 1st-order system, we show a 2nd-order system. Its equation is:

$$L\frac{d^2y}{dt^2} + M\frac{dy}{dt} + Ny = x(t)$$

It is often desirable to be able, as here, to set each parameter separately. However, simplifications are possible when liberties may be taken with the variables. Thus if $Ny = \eta$, $t(N/L)^{1/2} = \tau$, and $M/(LN)^{1/2} = \Delta$, the equation becomes:

$$\frac{d^2\eta}{d\tau^2} + \Delta\frac{d\eta}{d\tau} + \eta = x\left(\sqrt{\frac{L}{N}}\,\tau\right)$$



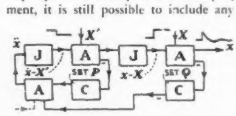
and results in the simpler block diagram shown.

In setting up block diagrams for equations as above, and hence also for Computors, one may almost always proceed as follows: Assume the highest derivative (order *n*) is available as a signal, and integrate it *n* times. This gives all the lower derivatives including the zeroeth. With these signals in combination, one supplies the assumed *n*-th derivative as expressed by the differential equation "solved" explicitly for that quantity. This method generalises satisfactorily for sets of equations. Sometimes other tricks are necessary, but the technique is quite universal. It is standard Differential Analyzer practice, for example.

INITIAL CONDITIONS   In physical systems there is usually an input variable which, as *stimulus*, determines initial conditions. The cases above are simple examples, with non-homogeneous equations. There was no question of how one embodies the initial values of the dependent variable(s) and the derivatives thereof. Formal mathematical equations are frequently presented, however, in homogeneous form, with specific values for all but the highest derivative. For instance consider (the dot-notation for derivatives is used):

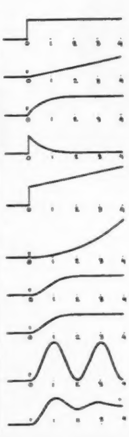
$$\ddot{x} + P\dot{x} + Qx = 0\,, \quad \text{and} \quad x(0) = X\,, \quad \dot{x}(0) = X'$$

This type of situation may be handled straightforwardly by the addition of step inputs in the loop, as the accompanying diagram shows. With this arrangement, it is still possible to include any "forcing function" to cover the non-homogeneous case by adding it in as usual ahead of the highest derivative. If this input were zero prior to the initial instant (and of course never infinite) it will not influence the initial conditions cited above.



Operators and Responses

$\varphi(p)$	$\psi(t)$
1	1
$\frac{1}{Tp}$	$\frac{t}{T}$
$\frac{1}{1+Tp}$	$1 - e^{-t/T}$
$\frac{Tp}{1+Tp}$	$e^{-t/T}$
$\frac{1+Tp}{Tp}$	$1 + \frac{t}{T}$
$\frac{1}{(Tp)^2}$	$\left(\frac{t}{T}\right)^2$
$\frac{1}{(1+Tp)^2}$	$1 + \left(\frac{t}{T} - 1\right)e^{-t/T}$
$\frac{1}{(1+Tp)(1+\alpha Tp)}$ $\alpha \neq 1$	$1 - \frac{1}{1-\alpha}\left[e^{-t/(\alpha T)} - \alpha e^{-t/T}\right]$
$\frac{1}{1+(Tp)^2}$	$1 - \cos\frac{t}{T}$
$\frac{1}{(1+\beta Tp)^2 + (Tp)^2}$ $\lambda^2 = 1+\beta^2$	$1 - \lambda e^{-\frac{\beta t}{\lambda^2 T}}\cos\left[\frac{t}{\lambda^2 T} + \tan^{-1}\beta\right]$



Here is the latest addition to our line ↗

Remington Rand INC.

ECKERT MAUCHLY DIVISION — Engineering Research Associates

- RESEARCH
- DEVELOPMENT
- MANUFACTURING
- SELLING

TOGETHER THEY ADD THEIR CAPACITY FOR...

LEADERSHIP AND PERFORMANCE IN

ELECTRONIC COMPUTERS

- INPUT DEVICES
- DATA PROCESSING
- STORAGE DEVICES
- OUTPUT DEVICES

The First Name in Business Electronics

For more than forty years Remington Rand has been a source of numerous significant machine developments for business. **Univac Fac-Tronic System** – latest in a long line – is the first universal electronic system for processing both numeric and alphabetic data without special coding. The system is flexible enough to fit any record-keeping application from comprehensive statistical problems of the U.S. Census Bureau to complex mathematical problems and huge records-analysis problems of industrial organizations. The forerunners of **Univac** – electronic computers Eniac and Binac – provided a testing ground for the techniques and equipment adapted for use in **Univac**. With production lines in operation, **Univac** orders are being solicited and deliveries made.

PROVEN LEADERSHIP

BALANCED PERFORMANCE

PROVEN PERFORMANCE

Four hundred five-item shipments priced, extended, totalled and prepared for printing (including name and address) in thirty-five minutes. Performance standards were exceeded when **Univac** – after the programming unit had been checked out – ran for 29 hours of continuous computation without interruption of any kind. At another time, covering 20 successive test units, 780 million pulses were read without interruption.

MATRIX ALGEBRA

ORDER	MULTIPLICATION SQ. X SQ.	MULTIPLICATION SQ. X COL.	INVERSION
50	1 hr.	1 min.	1 hr.
100	7 hrs.	7.5 mins.	8 hrs.
200	55 hrs.	30 mins.	57 hrs.
300	185 hrs.	1 hr.	200 hrs.

Remington Rand INC.

SMALL ROBOTS

FOR EDUCATIONAL PURPOSES

——— YOU CAN OPERATE THEM YOURSELF ———

Finished:

GANTRY CRANE: Rolls on eight-foot rails, and picks up and carries a small load from one place to another. Operates by remote control, using stepping switches and a cable.

SIMON, the Miniature Mechanical Brain: Takes in numbers up to 255, and performs nine mathematical or logical operations, under the control of a punched paper tape, or manually. Described in "Scientific American" Nov. 1950, and "Radio Electronics", Oct. 1950.

SQUEE, the Robot Squirrel: Rolls over the floor, picks up "nuts" in his hands, takes them to his "nest", there leaves them, and then goes hunting for more nuts. Self-operating. Described in "Newsweek", Aug. 27, 1951, "Radio Electronics", Dec. 1951, and "Popular Science", July, 1952.

ELECTRIC SHOVEL: Operating model of a steam shovel with electric motors for raising or lowering boom, extending or retracting arm, moving forwards, backwards, or turning. Operates by remote control, using a stepping switch and a cable.

DIVORCE MILL, with Bigamy Alarm: Reports the state a man is in as a result of the events "is born, is married, is divorced, wife dies". If he gets married twice without divorce or widowhood intervening, the bigamy alarm goes off. Events are reported by pushing buttons; relays report the states. Mentioned in "Newsweek", Dec. 22, 1952.

Under design and construction:

FRANKEN, the Learner: Solves a maze of 32 squares with movable barriers, and learns the location of "latches" which must be "pressed" in a certain sequence so that "food" may be "unlocked".

GEORGE, the Go-Getter: Makes a sequence of visits to specified stations picking up or dropping off small packages. Stops or does not stop at a station depending on a light beam.

GAME-PLAYING machines, for Nim, Tittattoe, etc: Under design.

Plans may be purchased or ordered.

Machines may be rented for exhibit, etc., or ordered.

Do write us -- your inquiry will be welcome.

Edmund C. Berkeley and Associates, 36 West 11 St., New York 11, N.Y.